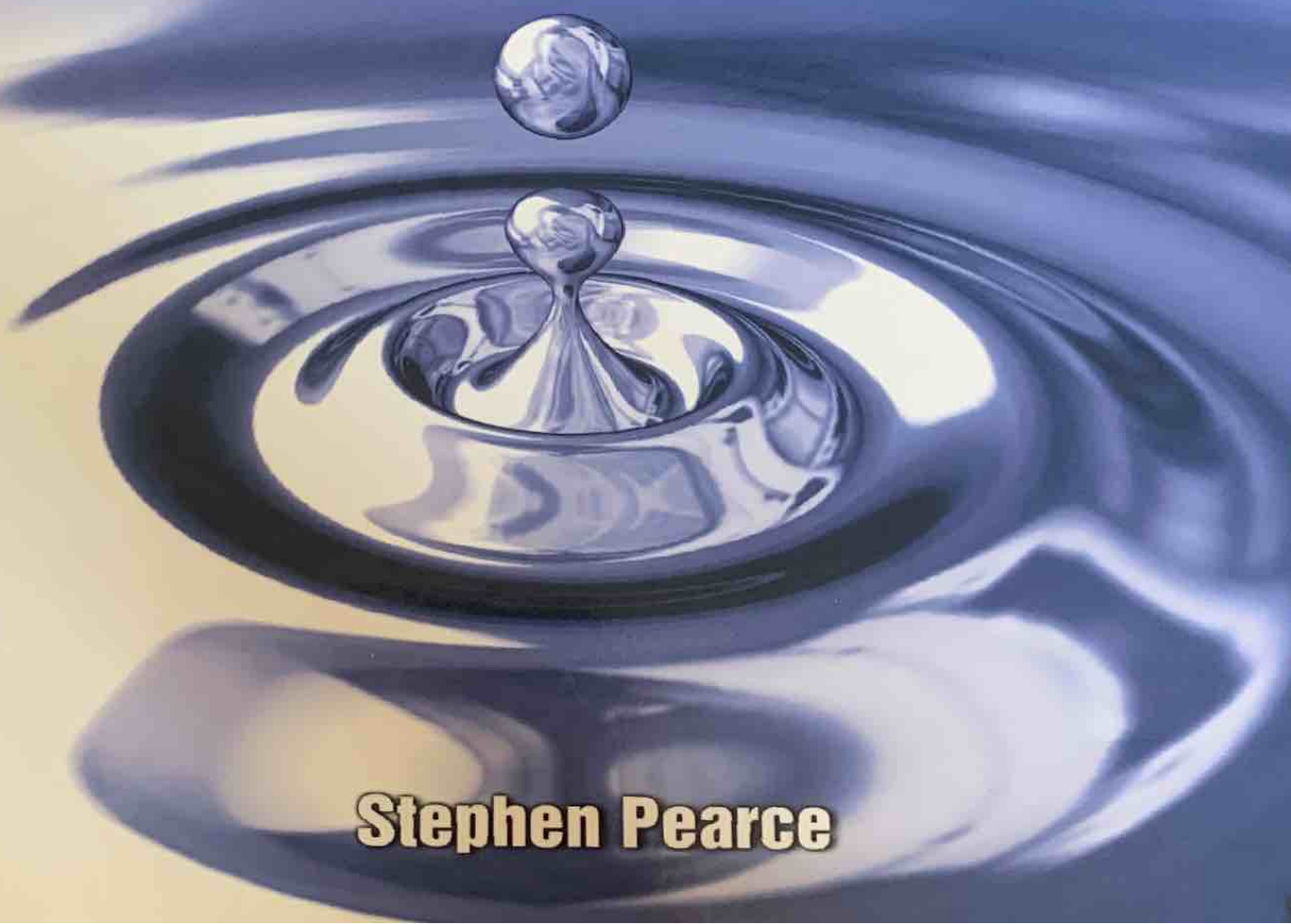


# TARGET MATHS

Year 6



**Stephen Pearce**

# CONTENTS

<b>NUMBERS AND THEIR PROPERTIES</b>			<b>MULTIPLICATION AND DIVISION</b>	
Multiplying/Dividing by 10, 100, 1000	2		Understanding Multiplication	42
Rounding	3		Multiplication Problems	43
Estimating	4		Understanding Division	44
Odd and Even Numbers	5		Division Problems	45
Negative Numbers	6		Multiplication Facts	46
Number Sequences	8		Remainders	47
Multiples	9		Rounding Remainders	48
Divisibility Tests	10		Mental Strategies ( $\times$ and $\div$ )	50
Prime Numbers	11		Doubling and Halving	55
Prime Factors	12		Using Doubling and Halving	56
Square Numbers	13		Informal Method for Multiplication	58
			Standard Method for Multiplication	59
			Multiplication of Decimals	60
			Long Multiplication	61
			Informal Method for Division	62
			Standard Method for Division	63
<b>FRACTIONS, DECIMALS, PERCENTAGES</b>			<b>SOLVING PROBLEMS</b>	
Equivalent Fractions	14		Calculator Skills	64
Ordering Fractions	16		Using a Calculator	66
Improper Fractions	17		Writing a Formula	67
Decimal Fractions	18		Statements	68
Ordering Decimals	20		Puzzle Page - Crossnumbers	69
Rounding Decimals	21		Real Life Problems	70
Fractions and Decimals	22		Money Problems	72
Fractions of Quantities	23			
Percentages	24		<b>MEASURES</b>	
Percentages of Numbers	26		Length-Metric Measures	74
Ratio and Proportion	27		Length - Problems	76
Percentages and Money	28		Reading Scales	77
			Mass - Metric Measures	78
			Mass - Problems	79
			Capacity - Metric Measures	80
			Capacity - Problems	81
			Imperial Units	82
			Area and Perimeter	84
			Units of Time	86
			Time Zones	88
			Time Problems	89
<b>ADDITION AND SUBTRACTION</b>				
Understanding Addition	30			
Understanding Subtraction	31			
Mental Strategies (+ and -)	32			
Informal Methods for Addition	36			
Standard Method For Addition	37			
Finding Totals	38			
Informal Methods For Subtraction	39			
Standard Method For Subtraction	40			
Finding Differences	41			

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## SHAPE AND SPACE

Lines	90
Two-dimensional Shapes	92
Co-ordinates	94
Three-dimensional Shapes	96
Making 2-D Shapes	98
Nets	99
Visualising 3-D Shapes	100
Translations	101
Reflections	102
Rotation	104
Angles	105
Missing Angles	108

## HANDLING DATA

Probability	110
Interpreting Data	112
Bar Charts (Grouped Data)	114
Pie Chart	116
Conversion Graphs	118

## REVIEW PAGES

Properties of Numbers	120
Fractions, Decimals and Percentages	121
Calculations	122
Measures	123
Shape and Space	124
Handling Data	125
Puzzle Page - Find The Numbers	127
Puzzle Page - Missing Digits	128

On this page you will learn:

- to multiply and divide whole numbers by 10, 100 and 1000.

### Examples

$\times 10$  digits move 1 place to the left

$\times 100$  digits move 2 places to the left

$\times 1000$  digits move 3 places to the left

$\div 10$  digits move 1 place to the right

$\div 100$  digits move 2 places to the right

$\div 1000$  digits move 3 places to the right

$$134 \times 10 = 1340$$

$$134 \times 100 = 13400$$

$$134 \times 1000 = 134000$$

$$27000 \div 10 = 2700$$

$$27000 \div 100 = 270$$

$$27000 \div 1000 = 27$$

- to multiply and divide decimals by 10.

### Examples

The same rules apply.

$\times 10$  digits move 1 place to the left

$\div 10$  digits move 1 place to the right

$$1.7 \times 10 = 17$$

$$13 \div 10 = 1.3$$

$$0.6 \times 10 = 6.0$$

$$2.0 \div 10 = 0.2$$

## A

Multiply by 10.

1 38

2 174

3 200

4 1368

5 4520

6 12000

Divide by 10.

7 7000

8 820

9 35000

10 700000

11 2050

12 24360

Multiply by 100.

13 400

14 92

15 726

16 1200

17 3000

18 10000

Divide by 100.

19 1900

20 38000

21 450000

22 75600

23 2000000

24 90000

## B

Write the answers only.

1  $1427 \times 10$

2  $164 \times 100$

3  $56400 \div 10$

4  $280000 \div 1000$

5  $1308 \times 100$

6  $1.4 \times 10$

7  $12.0 \div 10$

8  $164000 \div 100$

9  $310 \times 1000$

10  $2.6 \div 10$

11  $0.7 \times 10$

12  $9500000 \div 1000$

13  $327180 \div 10$

14  $38912 \times 10$

15  $56000 \div 100$

16  $42 \times 1000$

## C

Copy and complete.

1  $\square \times 10 = 6.0$

2  $\square \div 10 = 3.0$

3  $\square \times 100 = 3040000$

4  $\square \div 100 = 2540$

5  $\square \times 1000 = 21000$

6  $\square \div 1000 = 500$

7  $\square \times 100 = 51000$

8  $\square \div 10 = 7.5$

9  $\square \times 10 = 42000$

10  $\square \div 100 = 3.2$

11  $\square \times 100 = 62$

12  $\square \div 100 = 0.8$

13  $\square \times 10 = 0.1$

14  $\square \div 1000 = 1291$

15  $\square \times 1000 = 1480000$

16  $\square \div 10 = 0.05$

## ROUNDING

3

On this page you will learn to round numbers to the nearest whole one or to the nearest multiple of 10 and to use rounding to approximate calculations.

### Examples

to the nearest 1	$19.7 \div 3.9 \rightarrow 20 \div 4 \rightarrow 5$
to the nearest 10	$329 + 264 \rightarrow 330 + 260 \rightarrow 590$
to the nearest 100	$638 \rightarrow 600, 2351 \rightarrow 2400$
to the nearest 1000	$4835 \rightarrow 5000, 13\,294 \rightarrow 13\,000$

**A** Round each of these numbers to the nearest:

<b>10</b>	<b>100</b>	<b>1000</b>	<b>10</b>	<b>100</b>	<b>1000</b>
<b>1</b> 288	<b>5</b> 743	<b>9</b> 4630	<b>13</b> 3799	<b>17</b> 4150	<b>21</b> 11 426
<b>2</b> 641	<b>6</b> 3450	<b>10</b> 7373	<b>14</b> 32	<b>18</b> 5838	<b>22</b> 549
<b>3</b> 67	<b>7</b> 1365	<b>11</b> 12 517	<b>15</b> 485	<b>19</b> 921	<b>23</b> 7802
<b>4</b> 365	<b>8</b> 216	<b>12</b> 5995	<b>16</b> 1843	<b>20</b> 2094	<b>24</b> 19 287.

### B

Round these football crowds:

a) to the nearest 1000.

b) to the nearest 100.

<b>1</b> Arsenal	38 051
<b>2</b> Chelsea	34 646
<b>3</b> Leeds	39 837
<b>4</b> Liverpool	44 718
<b>5</b> Manchester Utd.	67 581
<b>6</b> Newcastle	51 625
<b>7</b> Sunderland	45 078
<b>8</b> Tottenham	34 453

Approximate by rounding to the nearest:

<b>10</b>	<b>whole one</b>
<b>9</b> $248 + 373$	<b>17</b> $6.5 + 7.3$
<b>10</b> $542 + 267$	<b>18</b> $18.2 + 6.7$
<b>11</b> $638 - 294$	<b>19</b> $20.8 - 6.3$
<b>12</b> $762 - 357$	<b>20</b> $43.2 - 17.8$
<b>13</b> $68 \times 5$	<b>21</b> $6.9 \times 3.1$
<b>14</b> $79 \times 9$	<b>22</b> $14.6 \times 5.1$
<b>15</b> $158 \div 4$	<b>23</b> $12.4 \div 2.1$
<b>16</b> $317 \div 8$	<b>24</b> $41.6 \div 6.9$

### C

Estimate each of the following. Give your answer to the nearest 10, 100, 1000, 10,000, 100 000 or 1 000 000. Explain how you made each estimate.

- |   |  |
|---|--|
| <b>1</b> pages in an encyclopaedia      | <b>7</b> words in the Bible                    |
| <b>2</b> people in the United Kingdom   | <b>8</b> children in a Secondary School        |
| <b>3</b> children in your school        | <b>9</b> the capacity of a bath in millilitres |
| <b>4</b> the distance to Rome in metres | <b>10</b> an adult's weight in grams           |
| <b>5</b> days you have lived            | <b>11</b> the length of the Thames in miles    |
| <b>6</b> people on a full bus           | <b>12</b> miles to Australia                   |

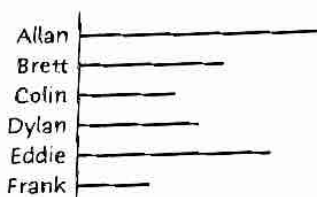
4 On this page you will learn to make and justify estimates.

## A

Estimate the numbers shown by the arrows.



6 This bar line graph shows the percentage mark achieved by children in a test.



Allan got 100%.

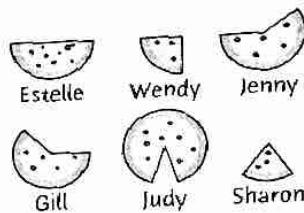
- Who got 50%?
- Who got twice as many as Colin?
- Who got half as many as Brett?
- Estimate the mark achieved by each of the five boys.

## B

Estimate the numbers shown by the arrows.



6 Six friends ordered pizzas. When they had finished eating, their pizzas looked like this:



Who had eaten:

- twice as much as Gill?
- five times as much as Judy?
- half as much as Sharon?

7 Estimate the proportion of each pizza which had been eaten as a percentage.

## C

Estimate the numbers shown by the arrows.



6 Estimate the number of words in your reading book. Explain your method.



Use your method to estimate the number of words in:

- a picture book
- a dictionary
- an encyclopaedia.

7 Estimate the number of times someone blinks in a day. Explain your method.

# ODD AND EVEN NUMBERS

5

On this page you will learn to recognise odd and even numbers and to give examples that match general statements about odd or even numbers.

An even number is a number which can be divided exactly by 2.

An odd number cannot be divided by 2 without leaving a remainder.

## Examples

$$34 \div 2 = 17$$

34 is an even number.

$$35 \div 2 = 17 \text{ remainder } 1$$

35 is an odd number.

## A

Give three examples for each of the following questions.  
Is the answer odd or even:

- 1 if you subtract an odd number from an even number?
- 2 if you subtract an odd number from an odd number?
- 3 if you subtract an even number from an even number?
- 4 if you subtract an even number from an odd number?

## B

Use each set of digits to make six 3-digit numbers.

For each question state how many of your numbers are odd and how many are even.

1 (2, 7, 4)

2 (5, 1, 9)

3 (7, 6, 3)

4 (6, 2, 8)

Give four examples for each of the following questions.

- 5 Is the product odd or even:
  - a) if you multiply two even numbers?
  - b) if you multiply two odd numbers?
  - c) if you multiply an odd number and an even number?

## C

Use these digits.

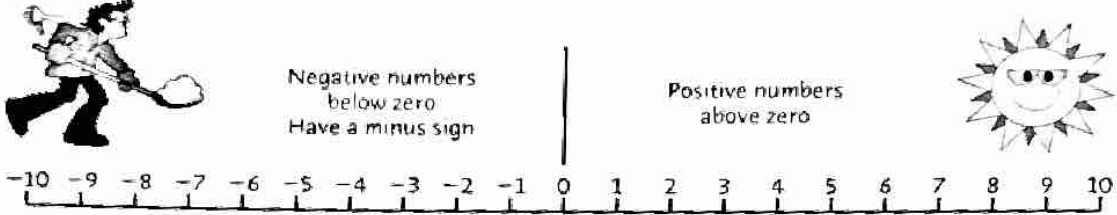
1 5 2 3

- 1 List all the four-digit odd numbers you can make.
- 2 List all the four-digit even numbers you can make.

Copy and complete these rules by writing 'odd' or 'even' in the box.

- 3 If you multiply three even numbers the answer is always .
- 4 If you multiply three odd numbers the answer is always .
- 5 If you multiply two odd numbers and one even number the answer is always .
- 6 If you multiply two even numbers and one odd number the answer is always .
- 7 Give four examples for each of the rules.

On these pages you will learn to recognise and order negative numbers.



Negative numbers below zero  
Have a minus sign

Positive numbers above zero

We often use negative numbers in the context of temperature.

**Example**

The temperature is  $6^{\circ}\text{C}$ . It falls  $8^{\circ}\text{C}$ .  
What is the new temperature?  
Answer  $-2^{\circ}\text{C}$ .

### A

Copy and complete by writing the missing numbers in the boxes

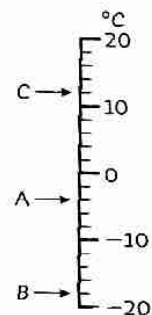
- 1  $-7$      $1$   $3$   $5$
- 2  $10$   $7$   $4$   $1$
- 3  $-13$   $-10$   $-7$      $5$
- 4  $-10$   $-6$      $10$   $14$
- 5  $6$   $4$      $-4$   $-6$
- 6     $-1$   $-3$   $-5$   $-7$
- 7  $9$   $6$   $3$   $0$
- 8  $11$   $7$   $3$      $-13$

Put these numbers in order, smallest first.

- 9  $\begin{matrix} -8 & 0 \\ 6 & -5 \\ -3 & 4 \end{matrix}$
- 10  $\begin{matrix} 1 & -10 & 3 \\ 8 & -4 & -1 \end{matrix}$
- 11  $\begin{matrix} -7 & 9 & 0 \\ 2 & 4 & -2 \end{matrix}$
- 12  $\begin{matrix} -6 & -3 & 1 \\ 3 & -1 & 5 \end{matrix}$

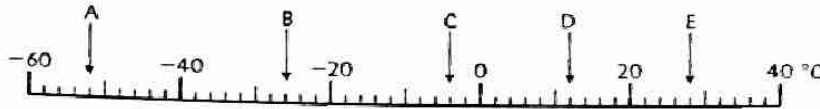
Look at the scale.

- 13 What temperatures are shown by the letters?
- 14 Which letter shows the coldest temperature?
- 15 Give the difference in temperature between:  
a) A and B    b) A and C    c) B and C.
- 16 What would the temperature be:  
a) if it was at A and fell  $13^{\circ}\text{C}$ ?  
b) if it was at B and rose  $19^{\circ}\text{C}$ ?  
c) if it was at C and fell  $15^{\circ}\text{C}$ ?
- 17 The temperature is  $-5^{\circ}\text{C}$  and it rises by  $10^{\circ}\text{C}$ .  
What is the new temperature?
- 18 The temperature is  $3^{\circ}\text{C}$  and it falls by  $10^{\circ}\text{C}$ .  
What is the new temperature?

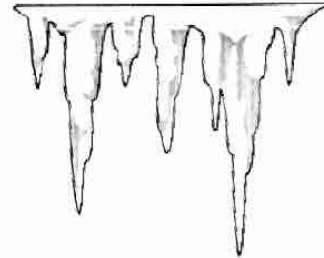




B



- 1 What temperatures are shown by the letters?
- 2 Give the difference in temperature between:
  - a) C and D
  - b) B and C
  - c) C and E
  - d) B and D.
- 3 What would the temperature be if it was:
  - a) at A and rose  $24^{\circ}\text{C}$ ?
  - b) at D and fell  $18^{\circ}\text{C}$ ?
  - c) at C and fell  $36^{\circ}\text{C}$ ?
  - d) at B and rose  $36^{\circ}\text{C}$ ?



Copy and complete the tables showing changes in temperature.

4

OLD	CHANGE	NEW
$5^{\circ}\text{C}$	$-9^{\circ}\text{C}$	$-4^{\circ}\text{C}$
$-3^{\circ}\text{C}$	$+10^{\circ}\text{C}$	
$-19^{\circ}\text{C}$	$+13^{\circ}\text{C}$	
$9^{\circ}\text{C}$	$-15^{\circ}\text{C}$	
$-12^{\circ}\text{C}$	$+8^{\circ}\text{C}$	
$13^{\circ}\text{C}$	$-16^{\circ}\text{C}$	

5

OLD	CHANGE	NEW
$-6^{\circ}\text{C}$	$+8^{\circ}\text{C}$	$2^{\circ}\text{C}$
	$-6^{\circ}\text{C}$	$-2^{\circ}\text{C}$
	$+4^{\circ}\text{C}$	$-13^{\circ}\text{C}$
	$-8^{\circ}\text{C}$	$-4^{\circ}\text{C}$
	$+20^{\circ}\text{C}$	$12^{\circ}\text{C}$
	$-12^{\circ}\text{C}$	$-17^{\circ}\text{C}$

6

OLD	CHANGE	NEW
$9^{\circ}\text{C}$		$-4^{\circ}\text{C}$
$1^{\circ}\text{C}$		$-11^{\circ}\text{C}$
$4^{\circ}\text{C}$		$-5^{\circ}\text{C}$
$-5^{\circ}\text{C}$		$9^{\circ}\text{C}$
$-3^{\circ}\text{C}$		$-16^{\circ}\text{C}$
$6^{\circ}\text{C}$		$-4^{\circ}\text{C}$

C

Copy and complete the table showing the average temperatures recorded in January and July at places in different countries.

1

Country	January	July	Range
U.S.A.	$-7^{\circ}\text{C}$	$26^{\circ}\text{C}$	$33^{\circ}\text{C}$
Greenland	$-35^{\circ}\text{C}$	$-1^{\circ}\text{C}$	
Germany	$-2^{\circ}\text{C}$	$18^{\circ}\text{C}$	
Japan	$-9^{\circ}\text{C}$	$21^{\circ}\text{C}$	
Switzerland	$-6^{\circ}\text{C}$	$11^{\circ}\text{C}$	
Iran	$-3^{\circ}\text{C}$		$40^{\circ}\text{C}$
China	$-19^{\circ}\text{C}$		$42^{\circ}\text{C}$
Poland	$-5^{\circ}\text{C}$		$20^{\circ}\text{C}$
Norway	$-14^{\circ}\text{C}$		$23^{\circ}\text{C}$
Korea	$-22^{\circ}\text{C}$		$42^{\circ}\text{C}$
Romania		$24^{\circ}\text{C}$	$29^{\circ}\text{C}$
Russia		$18^{\circ}\text{C}$	$58^{\circ}\text{C}$
Canada		$20^{\circ}\text{C}$	$39^{\circ}\text{C}$
Sweden		$16^{\circ}\text{C}$	$20^{\circ}\text{C}$

Copy and complete this table showing the goal difference of the top and bottom six football teams in the 1999-2000 Premiership.

2

Team	Goals for	Goals against	Goal difference
Man. Utd	97	45	
Arsenal	73	43	
Leeds	58		+15
Liverpool	51		+21
Chelsea		34	+19
Aston Villa		35	+11
...	...	...	...
...	...	...	...
Southampton	45	62	
Derby	44	57	
Bradford	38		-30
Wimbledon	46		-28
Sheff. Wed.		70	-32
Watford		77	-42

On this page you will learn to extend number sequences.

To find the rule that links the numbers study the gaps.

### Examples

4	0	-4	-8	-12	The rule is 'subtract 4.'
3	6	12	24	48	The rule is 'multiply by 2'.
1	3	6	10	15	The rule is 'add one more each time'.

## A

Write the first six numbers in each sequence.

	Start at	Rule		Start at	Rule		Start at	Rule
1	210	-4	6	0.6	+0.1	11	0.01	+0.02
2	65	+4	7	201	+101	12	3.5	-0.5
3	62	+5	8	47	+9	13	76	-11
4	-60	+5	9	425	-50	14	1.25	+0.25
5	-1	-1	10	-3	-2	15	-18	-2

## B

Complete these sequences by filling in the boxes. Write down the rule each time.

- |   |                      |                      |                      |                      |                      |                      |                      |    |                      |                      |                      |                      |                      |                      |                      |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1 | -4                   | -3                   | -2                   | -1                   | <input type="text"/> | <input type="text"/> | <input type="text"/> | 9  | 115                  | <input type="text"/> | 101                  | <input type="text"/> | 87                   | <input type="text"/> | 73                   |
| 2 | 1.2                  | 2.4                  | 3.6                  | 4.8                  | <input type="text"/> | <input type="text"/> | <input type="text"/> | 10 | 100                  | <input type="text"/> | 81                   | <input type="text"/> | 66                   | <input type="text"/> | 55                   |
| 3 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 64                   | 70                   | 76                   | 82                   | 11 | <input type="text"/> | -5                   | <input type="text"/> | <input type="text"/> | 4                    | 7                    | 10                   |
| 4 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 0.9                  | 1.1                  | 1.3                  | 1.5                  | 12 | <input type="text"/> | 4                    | <input type="text"/> | <input type="text"/> | 25                   | 36                   | 49                   |
| 5 | 19                   | 38                   | <input type="text"/> | <input type="text"/> | <input type="text"/> | 114                  | 133                  | 13 | <input type="text"/> | <input type="text"/> | <input type="text"/> | -5                   | -8                   | -11                  | -14                  |
| 6 | 0.09                 | 0.18                 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 0.54                 | 0.63                 | 14 | 2                    | 4                    | <input type="text"/> | 16                   | <input type="text"/> | 64                   | <input type="text"/> |
| 7 | -33                  | -23                  | -13                  | -3                   | <input type="text"/> | <input type="text"/> | <input type="text"/> | 15 | 290                  | <input type="text"/> | 170                  | <input type="text"/> | <input type="text"/> | 65                   | 50                   |
| 8 | <input type="text"/> | 42                   | 63                   | <input type="text"/> | 105                  | 126                  | <input type="text"/> | 16 | 1.3                  | <input type="text"/> | 2.1                  | <input type="text"/> | <input type="text"/> | 3.3                  | 3.7                  |

## C

Copy these sequences and write the next three numbers. Write down the rule each time.

- |   |      |      |      |      |    |      |     |      |     |    |     |      |      |      |
|---|------|------|------|------|----|------|-----|------|-----|----|-----|------|------|------|
| 1 | -8   | -6   | -4   | -2   | 7  | 11   | 30  | 49   | 68  | 13 | 1.0 | 0.75 | 0.5  | 0.25 |
| 2 | 2.1  | 4.2  | 6.3  | 8.4  | 8  | 15   | 11  | 7    | 3   | 14 | 154 | 132  | 110  | 88   |
| 3 | 25   | 20   | 15   | 10   | 9  | 100  | 82  | 64   | 46  | 15 | 3.0 | 2.25 | 1.5  | 0.75 |
| 4 | 1.5  | 2.0  | 3.0  | 4.5  | 10 | 49   | 64  | 81   | 100 | 16 | -21 | -15  | -10  | -6   |
| 5 | -15  | -11  | -7   | -3   | 11 | 124  | 99  | 74   | 49  | 17 | 50  | 99   | 148  | 197  |
| 6 | 10.0 | 10.1 | 10.3 | 10.6 | 12 | 0.05 | 0.1 | 0.15 | 0.2 | 18 | 0.3 | 0.41 | 0.53 | 0.66 |

# MULTIPLES

On this page you will learn to recognise multiples.

Multiples are the numbers in a multiplication table.

### Example

The multiples of 3 are the numbers in the 3 times table.

3, 6, 9, 12, 15, 18 ... 48, 51, 54, 57, 60 ... 150, 153, 156, 159 and so on.

### A

Write the first six multiples of each of these numbers.

- 1 3                      4 25
- 2 7                      5 12
- 3 9                      6 20

Write Yes or No.

- 7 Is 48 a multiple of 6?
- 8 Is 54 a multiple of 7?
- 9 Is 120 a multiple of 8?
- 10 Is 74 a multiple of 9?
- 11 Is 77 a multiple of 11?
- 12 Is 180 a multiple of 18?
  
- 13 Is 80 a multiple of 12?
- 14 Is 300 a multiple of 15?
- 15 Is 450 a multiple of 50?
- 16 Is 93 a multiple of 6?
- 17 Is 81 a multiple of 9?
- 18 Is 155 a multiple of 25?
  
- 19 Is 98 a multiple of 11?
- 20 Is 140 a multiple of 20?
- 21 Is 63 a multiple of 7?
- 22 Is 31 a multiple of 13?
- 23 Is 60 a multiple of 12?
- 24 Is 98 a multiple of 8?

### B

Which number should not be in the box?

- 1 Multiples of 8  
120, 64, 36, 48
- 2 Multiples of 6  
46, 24, 84, 54
- 3 Multiples of 7  
84, 21, 56, 48
- 4 Multiples of 30  
150, 90, 230, 60
- 5 Multiples of 11  
110, 122, 99, 143
- 6 Multiples of 9  
64, 108, 81, 45

Look at the numbers in the ring. Write down the numbers which are multiples of:

- 7 4                      9 9
- 8 6                      10 10

24 60 36 48 180  
54 30 32 40 27

### C

The lowest common multiple of two or more numbers is the smallest number that can be divided exactly by each of them.

### Examples

The lowest common multiple of 2 and 5 is 10.

The lowest common multiple of 10 and 12 is 60.

The lowest common multiple of 2, 5 and 6 is 30.

Find the lowest common multiple of each of these pairs or groups of numbers.

- 1 2 and 3                      13 2, 5 and 10
- 2 3 and 4                      14 2, 7 and 21
- 3 4 and 5                      15 4, 10 and 25
- 4 3 and 5                      16 2, 3 and 4
- 5 6 and 8                      17 3, 4 and 5
- 6 4 and 10                      18 4, 8 and 12
- 7 2 and 7                      19 2, 3 and 5
- 8 10 and 6                      20 4, 5 and 6
- 9 8 and 4                      21 3, 4 and 10
- 10 4 and 6                      22 3, 4 and 6
- 11 5 and 9                      23 3, 4 and 9
- 12 10 and 8                      24 2, 5 and 7



# PRIME NUMBERS

On this page you will learn to recognise prime numbers.

A prime number is a number which is divisible by only two different numbers: by itself and by one.

The first four prime numbers are 2, 3, 5 and 7. Notice that 1 is *not* a prime number. 4, 6, 8, 9 and 10 are not prime numbers because they are divisible by at least one of the first four prime numbers.

To find out if a two-digit number is a prime number you need to work out if it is divisible by one of the first four prime numbers, 2, 3, 5 and 7.

### Examples

- 28 is divisible by 7.
  - 29 is not divisible by 2, 3, 5 or 7.
  - 30 is divisible by 2, 3 and 5.
  - 31 is not divisible by 2, 3, 5 or 7.
- 28 is not a prime number.
  - 29 is a prime number.
  - 30 is not a prime number.
  - 31 is a prime number.

### A

Write down the prime number in each group.

- 1 7, 8, 9
- 2 16, 17, 18
- 3 21, 22, 23
- 4 30, 31, 32
- 5 47, 48, 49
- 6 57, 58, 59
- 7 66, 67, 68
- 8 73, 74, 75
- 9 Find all the prime numbers below 50. There are 15. (Remember, 1 is not a prime number.)
- 10 Find the next prime number after 37.



### B

Write down the two numbers in each group which are *not* prime numbers.

- 1 1 11 21 31
- 2 40 41 42 43
- 3 33 43 53 63
- 4 47 57 67 77
- 5 51 61 71 81
- 6 67 77 87 97

Write down the next prime number after:

- 7 30                      9 50
- 8 45                      10 75

- 11 Find all the prime numbers below 100. There are 25.

### C

In the questions in this section you may need to work out if a number is divisible by prime numbers other than 2, 3, 5 and 7. 121 is not a prime number because it is divisible by 11.

### Example

Which of these are prime numbers?

- 1 103                      5 133
- 2 111                      6 139
- 3 116                      7 153
- 4 127                      8 181

Explain why the following are not prime numbers.

- 9 74                      13 143
- 10 87                      14 169
- 11 91                      15 187
- 12 115                      16 289

# PRIME FACTORS

12

On this page you will learn to identify prime factors and use them for finding products.

Factors are numbers that divide exactly into another number. It is useful to think of factors as pairs of numbers whose product is the target number.

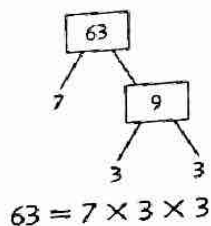
## Example

Find the factors of 12.  $1 \times 12$   $2 \times 6$   $3 \times 4$  Factors of 12: 1, 2, 3, 4, 6, 12.

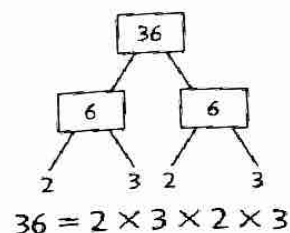
A factor which is also a prime number is a *prime factor*.

To find the prime factors of a number we can use a factor tree.

A factor tree for 63



A factor tree for 36



Prime factors can be used to find products.

## Example

$$42 \times 36 = 42 \times 2 \times 3 \times 2 \times 3 = 126 \times 2 \times 2 \times 3 = 252 \times 2 \times 3 = 756 \times 2 = 1512$$

## A

Find all the factors of the following numbers.

- |      |      |
|------|------|
| 1 6  | 5 27 |
| 2 16 | 6 30 |
| 3 20 | 7 32 |
| 4 22 | 8 36 |

Copy and complete as in the example above.

- 9  $13 \times 6 = 13 \times 3 \times 2 = \square$
- 10  $16 \times 12 = 16 \times 3 \times 2 \times 2 = \square$
- 11  $24 \times 8 = 24 \times 2 \times 2 \times 2 = \square$
- 12  $31 \times 14 = 31 \times 7 \times 2 = \square$
- 13  $23 \times 15 = 23 \times 5 \times 3 = \square$
- 14  $25 \times 18 = 25 \times 2 \times 3 \times 3 = \square$
- 15  $35 \times 9 = 35 \times 3 \times 3 = \square$

## B

Use a factor tree to find all the prime factors of:

- |      |      |
|------|------|
| 1 24 | 5 72 |
| 2 40 | 6 75 |
| 3 42 | 7 88 |
| 4 54 | 8 90 |

Break the second number down into prime factors to help work out:

- 9  $31 \times 12$
- 10  $14 \times 25$
- 11  $32 \times 20$
- 12  $38 \times 24$
- 13  $39 \times 36$
- 14  $51 \times 42$

## C

Use a factor tree to find all the prime factors of:

- |      |       |
|------|-------|
| 1 48 | 5 100 |
| 2 60 | 6 144 |
| 3 81 | 7 162 |
| 4 84 | 8 256 |

Break the second number down into prime factors to help work out:

- 9  $61 \times 48$
- 10  $53 \times 42$
- 11  $56 \times 45$
- 12  $65 \times 56$
- 13  $76 \times 64$
- 14  $89 \times 72$

# SQUARE NUMBERS

On this page you will learn to recognise square numbers.

When a number is multiplied by itself you get a square number. They are called square numbers because they make square patterns.

•  
 $1^2 = 1 \times 1 = 1$

• •  
• •  
 $2^2 = 2 \times 2 = 4$

• • •  
• • •  
• • •  
 $3^2 = 3 \times 3 = 9$

• • • •  
• • • •  
• • • •  
• • • •  
 $4^2 = 4 \times 4 = 16$

## A

1 Complete this table up to  $12^2$ .

$1^2 = 1 \times 1 = 1$

$2^2 = 2 \times 2 = 4$

$3^2 = 3 \times 3 = 9$

Work out

2  $4^2 + 2^2$       8  $10^2 + 7^2$

3  $5^2 + 3^2$       9  $9^2 + 1^2$

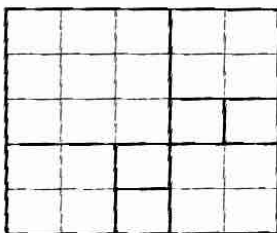
4  $6^2 + 1^2$       10  $8^2 + 5^2$

5  $5^2 - 3^2$       11  $9^2 - 4^2$

6  $8^2 - 6^2$       12  $10^2 - 6^2$

7  $6^2 - 3^2$       13  $8^2 - 7^2$

14 Here is a  $5 \times 5$  square divided into eight smaller squares.



Draw a  $7 \times 7$  square and design a pattern which divides it into nine smaller squares.

## B

Work out

- |          |           |
|----------|-----------|
| 1 $20^2$ | 5 $31^2$  |
| 2 $21^2$ | 6 $13^2$  |
| 3 $19^2$ | 7 $40^2$  |
| 4 $15^2$ | 8 $100^2$ |

Use a calculator to find out which number, when multiplied by itself, gives a product of:

- |         |          |
|---------|----------|
| 9 729   | 13 2116  |
| 10 196  | 14 784   |
| 11 1225 | 15 1024  |
| 12 484  | 16 6889. |

Find a pair of square numbers which give a total of:

- |        |         |
|--------|---------|
| 17 13  | 21 73   |
| 18 40  | 22 181  |
| 19 125 | 23 97   |
| 20 74  | 24 113. |

Find a pair of square numbers which give a difference of:

- |       |         |
|-------|---------|
| 25 7  | 29 80   |
| 26 84 | 30 300  |
| 27 45 | 31 32   |
| 28 39 | 32 105. |

## C

*Lagrange's Theorem*

A famous mathematician called Lagrange proved that every whole number could be written as the sum of four or fewer square numbers.

### Examples

$19 = 16 + 1 + 1 + 1$

$35 = 25 + 9 + 1$

$47 = 36 + 9 + 1 + 1$

Make the following numbers from four or fewer square numbers.

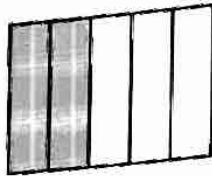
- |      |        |
|------|--------|
| 1 10 | 9 96   |
| 2 15 | 10 120 |
| 3 24 | 11 141 |
| 4 48 | 12 160 |
| 5 57 | 13 199 |
| 6 62 | 14 230 |
| 7 72 | 15 358 |
| 8 80 | 16 423 |

17 A square playground has a perimeter of 100 metres. What is its area?

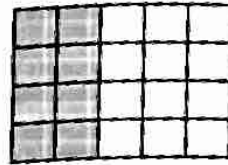
On these pages you will learn to change a fraction to an equivalent fraction by cancelling or by multiplying.

Equivalent fractions are fractions that look different but are the same.

**Example**



$$\frac{2}{5} = \frac{8}{20}$$



A fraction can be changed to an equivalent fraction by:

**CANCELLING**

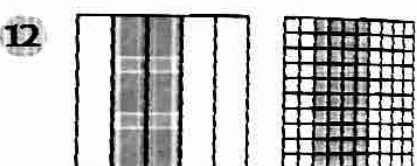
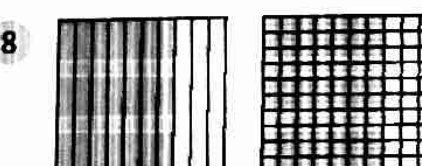
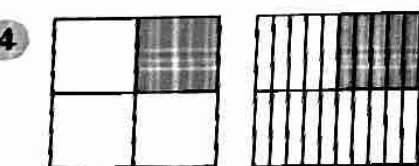
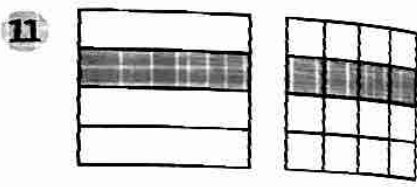
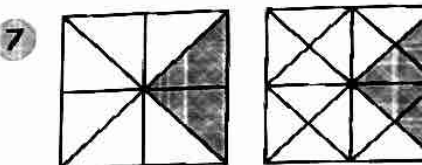
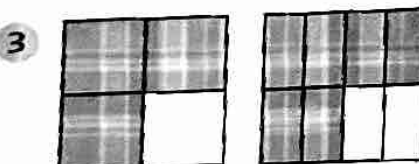
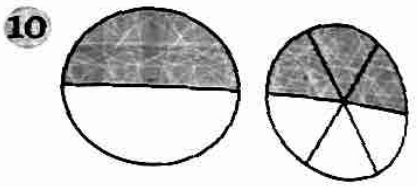
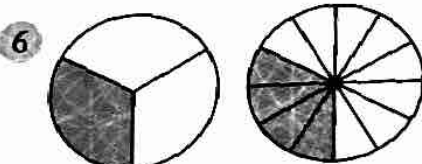
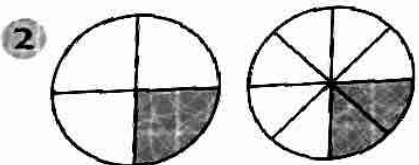
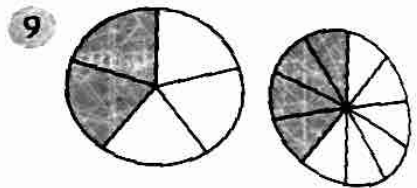
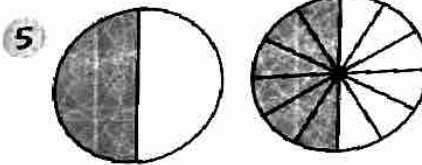
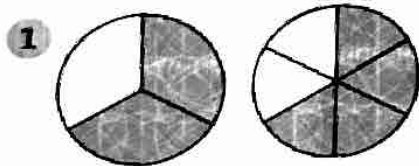
**Example**  $\frac{6}{9} \left( \div 3 \right) = \frac{2}{3}$

**MULTIPLYING**

**Example**  $\frac{3}{4} \left( \times 4 \right) = \frac{12}{16}$

**A**

Write the equivalent fractions shown by the shaded areas in each pair of diagrams.





B

Copy and complete these equivalent fractions.

1  $\frac{2}{3} = \frac{\square}{12}$

4  $\frac{2}{15} = \frac{\square}{30}$

7  $\frac{3}{8} = \frac{9}{\square}$

10  $\frac{7}{8} = \frac{35}{\square}$

13  $\frac{4}{9} = \frac{\square}{36}$

2  $\frac{3}{10} = \frac{\square}{100}$

5  $\frac{3}{5} = \frac{\square}{20}$

8  $\frac{5}{7} = \frac{25}{\square}$

11  $\frac{3}{4} = \frac{\square}{28}$

14  $\frac{7}{20} = \frac{\square}{100}$

3  $\frac{1}{4} = \frac{\square}{16}$

6  $\frac{1}{6} = \frac{4}{\square}$

9  $\frac{2}{3} = \frac{12}{\square}$

12  $\frac{2}{5} = \frac{\square}{25}$

15  $\frac{2}{7} = \frac{\square}{21}$

Cancel each fraction into its simplest form.

16  $\frac{5}{20}$

18  $\frac{8}{40}$

20  $\frac{90}{100}$

22  $\frac{14}{16}$

24  $\frac{16}{28}$

26  $\frac{9}{12}$

28  $\frac{8}{12}$

30  $\frac{25}{80}$

17  $\frac{6}{14}$

19  $\frac{15}{27}$

21  $\frac{10}{15}$

23  $\frac{36}{60}$

25  $\frac{28}{35}$

27  $\frac{48}{100}$

29  $\frac{30}{36}$

31  $\frac{20}{32}$

Continue these fraction chains for five further terms.

32  $\frac{1}{3} = \frac{2}{6} = \frac{3}{9}$

33  $\frac{3}{4} = \frac{6}{8} = \frac{9}{12}$

34  $\frac{7}{10} = \frac{14}{20} = \frac{21}{30}$

C

Pick out the letters above the fractions equivalent to the fraction in the brackets.

Rearrange those letters to make a word using the clue.

1 ( $\frac{1}{10}$ , a food)

E	C	N	R	L	A	B	E	D	T
$\frac{3}{30}$	$\frac{6}{66}$	$\frac{2}{10}$	$\frac{8}{80}$	$\frac{20}{100}$	$\frac{2}{20}$	$\frac{4}{40}$	$\frac{5}{25}$	$\frac{9}{90}$	$\frac{10}{50}$

5 ( $\frac{1}{4}$ , a city in England)

C	H	E	R	S	D	T	L	A	E
$\frac{4}{12}$	$\frac{7}{30}$	$\frac{2}{8}$	$\frac{8}{24}$	$\frac{5}{20}$	$\frac{3}{12}$	$\frac{10}{44}$	$\frac{6}{24}$	$\frac{15}{40}$	$\frac{4}{16}$

2 ( $\frac{1}{2}$ , a fruit)

A	P	G	L	E	N	H	P	C	R
$\frac{7}{14}$	$\frac{6}{16}$	$\frac{8}{16}$	$\frac{4}{10}$	$\frac{2}{4}$	$\frac{3}{9}$	$\frac{12}{20}$	$\frac{5}{10}$	$\frac{25}{40}$	$\frac{9}{18}$

6 ( $\frac{3}{8}$ , a tool)

H	D	I	E	P	L	A	S	T	C
$\frac{15}{40}$	$\frac{14}{32}$	$\frac{21}{56}$	$\frac{6}{16}$	$\frac{8}{20}$	$\frac{24}{64}$	$\frac{36}{80}$	$\frac{9}{24}$	$\frac{20}{48}$	$\frac{27}{72}$

3 ( $\frac{2}{3}$ , a European country)

A	N	G	E	T	S	L	E	D	W
$\frac{6}{10}$	$\frac{8}{12}$	$\frac{21}{30}$	$\frac{4}{6}$	$\frac{8}{15}$	$\frac{18}{27}$	$\frac{15}{24}$	$\frac{10}{15}$	$\frac{20}{30}$	$\frac{6}{9}$

7 ( $\frac{3}{5}$ , an English county)

N	O	D	R	E	N	F	V	L	K
$\frac{9}{16}$	$\frac{12}{20}$	$\frac{27}{45}$	$\frac{20}{30}$	$\frac{6}{10}$	$\frac{15}{25}$	$\frac{33}{50}$	$\frac{9}{15}$	$\frac{20}{35}$	$\frac{30}{55}$

4 ( $\frac{3}{4}$ , a boy's name)

O	N	C	E	I	R	L	A	N	Y
$\frac{4}{6}$	$\frac{6}{8}$	$\frac{16}{20}$	$\frac{75}{100}$	$\frac{9}{15}$	$\frac{10}{16}$	$\frac{30}{40}$	$\frac{24}{30}$	$\frac{9}{12}$	$\frac{15}{20}$

8 ( $\frac{5}{6}$ , a girl's name)

A	P	A	L	T	I	R	N	O	D
$\frac{25}{30}$	$\frac{55}{60}$	$\frac{20}{26}$	$\frac{10}{12}$	$\frac{15}{24}$	$\frac{40}{48}$	$\frac{30}{42}$	$\frac{50}{60}$	$\frac{45}{36}$	$\frac{15}{18}$

9 Now make up a similar problem of your own.

# ORDERING FRACTIONS

On this page you will use your knowledge of equivalent fractions to compare and order fractions.

### Example

Arrange  $\frac{1}{2}, \frac{3}{5}, \frac{8}{20}$  in ascending order.

Convert the fractions to a common denominator.

$$\frac{1}{2} = \frac{5}{10}, \quad \frac{3}{5} = \frac{6}{10}, \quad \frac{8}{20} = \frac{4}{10}$$

Arrange in ascending order.  $\frac{8}{20}, \frac{1}{2}, \frac{3}{5}$

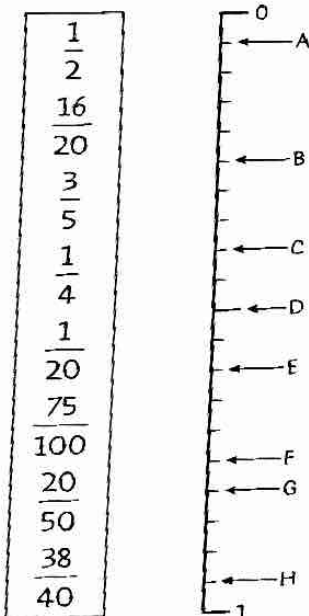
### A

Which of the fractions in the box are:

- 1 equal to one half?
- 2 less than one half?
- 3 greater than one half?

$\frac{1}{6}$	$\frac{6}{10}$	$\frac{3}{8}$	$\frac{50}{100}$
$\frac{3}{5}$	$\frac{7}{16}$	$\frac{11}{20}$	$\frac{6}{12}$

- 4 Match the fractions to the letters.

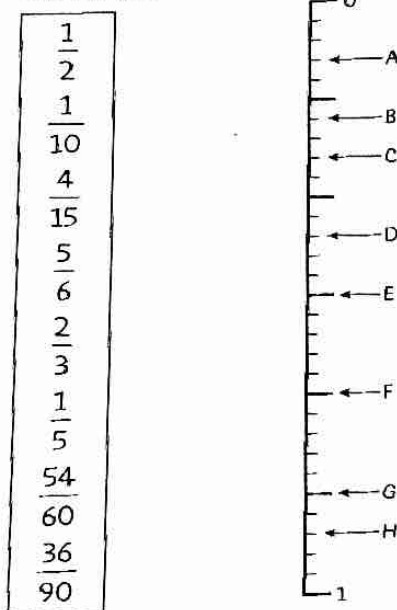


### B

Arrange in ascending order.

- 1  $\frac{1}{2}, \frac{2}{3}, \frac{4}{12}, \frac{5}{6}$
- 2  $\frac{5}{16}, \frac{3}{8}, \frac{1}{4}, \frac{1}{2}$
- 3  $\frac{5}{9}, \frac{3}{4}, \frac{2}{3}, \frac{1}{2}, \frac{5}{6}$
- 4  $1\frac{3}{4}, 2\frac{1}{4}, 1\frac{3}{10}, 1\frac{1}{2}$
- 5  $2\frac{2}{3}, 1\frac{3}{8}, 2\frac{1}{2}, 1\frac{3}{4}$
- 6  $1\frac{3}{5}, 2\frac{7}{20}, 1\frac{7}{10}, 2\frac{33}{100}$

- 7 Match the fractions to the letters.



### C

Find the number which is half way between each pair of numbers.

- 1 1 and  $1\frac{1}{2}$
- 2  $\frac{3}{10}$  and  $\frac{1}{2}$
- 3  $\frac{1}{2}$  and  $\frac{3}{4}$
- 4  $\frac{4}{9}$  and  $\frac{2}{3}$
- 5  $1\frac{1}{4}$  and  $1\frac{5}{12}$
- 6  $1\frac{1}{4}$  and  $1\frac{1}{2}$
- 7  $2\frac{1}{3}$  and  $2\frac{2}{3}$
- 8  $2\frac{1}{5}$  and  $2\frac{2}{5}$
- 9  $\frac{1}{2}$  and  $\frac{1}{3}$
- 10  $\frac{5}{8}$  and  $\frac{3}{4}$
- 11  $1\frac{2}{5}$  and  $1\frac{1}{2}$
- 12  $1\frac{2}{3}$  and  $1\frac{5}{6}$
- 13  $4\frac{3}{5}$  and  $4\frac{7}{10}$
- 14  $2\frac{1}{3}$  and  $2\frac{1}{4}$
- 15  $1\frac{3}{4}$  and  $1\frac{3}{5}$
- 16  $\frac{2}{3}$  and  $\frac{3}{5}$
- 17  $\frac{4}{7}$  and  $\frac{1}{2}$
- 18  $\frac{7}{9}$  and  $\frac{3}{4}$
- 19  $2\frac{3}{8}$  and  $2\frac{1}{3}$
- 20  $1\frac{5}{6}$  and  $2\frac{3}{4}$

# IMPROPER FRACTIONS

On this page you will learn to change an improper fraction to a mixed number and vice versa.

### Examples

- Change  $\frac{19}{5}$  to a mixed number.  
 Divide numerator by denominator.  $\frac{19}{5} = 19 \div 5 = 3 \text{ rem. } 4$   
 Put remainder over denominator.  $= 3\frac{4}{5}$
- Change  $7\frac{2}{7}$  to an improper fraction.  
 Multiply whole number by denominator.  $7 \times 7 = 49$   
 Add the numerator.  $49 + 2 = 51$   
 Put sum over denominator.  $7\frac{2}{7} = \frac{51}{7}$

### A

Write the shaded areas as both mixed numbers and improper fractions.

- 
- 
- 
- 
- 
- 
- 
- 
- 
- 

### B

Copy and complete.

- $\frac{11}{3} = 3\frac{\square}{3}$
- $\frac{21}{4} = 5\frac{\square}{4}$
- $\frac{23}{6} = \square\frac{5}{6}$
- $\frac{17}{7} = \square\frac{3}{7}$
- $\frac{28}{5} = \square\frac{\square}{5}$
- $\frac{48}{10} = \square\frac{\square}{10}$
- $\frac{41}{12} = \square\frac{\square}{12}$
- $\frac{123}{50} = \square\frac{\square}{50}$
- $4\frac{1}{3} = \frac{13}{\square}$
- $7\frac{3}{5} = \frac{38}{\square}$
- $4\frac{4}{7} = \frac{\square}{7}$
- $2\frac{5}{9} = \frac{\square}{9}$
- $3\frac{7}{8} = \frac{\square}{8}$
- $2\frac{71}{100} = \frac{\square}{\square}$

### C

Change to mixed numbers.

- |                  |                      |
|------------------|----------------------|
| 1 $\frac{17}{3}$ | 7 $\frac{77}{10}$    |
| 2 $\frac{29}{4}$ | 8 $\frac{55}{12}$    |
| 3 $\frac{35}{6}$ | 9 $\frac{63}{20}$    |
| 4 $\frac{20}{7}$ | 10 $\frac{119}{25}$  |
| 5 $\frac{31}{8}$ | 11 $\frac{163}{50}$  |
| 6 $\frac{43}{9}$ | 12 $\frac{453}{100}$ |

Change to improper fractions.

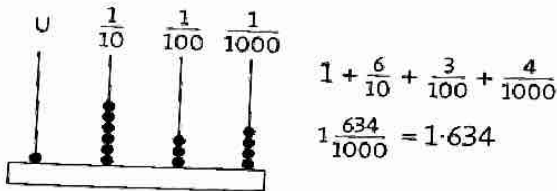
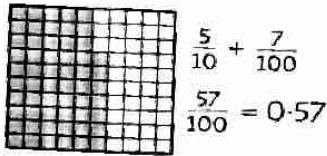
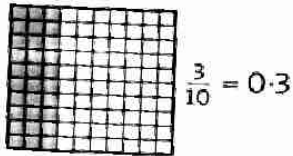
- |                   |                      |
|-------------------|----------------------|
| 13 $5\frac{2}{3}$ | 19 $5\frac{2}{9}$    |
| 14 $8\frac{3}{4}$ | 20 $9\frac{7}{10}$   |
| 15 $6\frac{3}{5}$ | 21 $3\frac{5}{12}$   |
| 16 $5\frac{1}{6}$ | 22 $4\frac{19}{20}$  |
| 17 $6\frac{3}{7}$ | 23 $6\frac{10}{11}$  |
| 18 $7\frac{5}{8}$ | 24 $12\frac{24}{25}$ |

Answer True or False.

- $\frac{19}{4} = 4\frac{3}{4}$
- $\frac{67}{5} < \frac{124}{10}$
- $6\frac{1}{2} > \frac{45}{7}$
- $\frac{76}{9} = 8\frac{2}{3}$
- $\frac{34}{5} < \frac{40}{6}$
- $\frac{111}{8} > 14\frac{1}{4}$

On these pages you will learn what each digit in a decimal fraction represents.

**Examples**



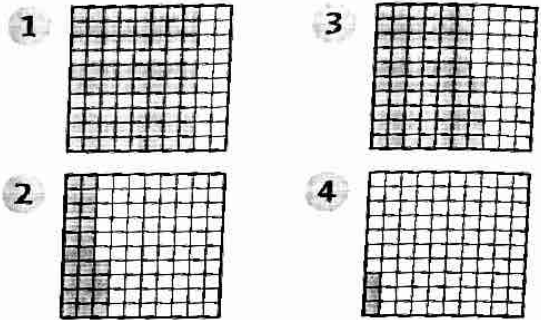
The value of a digit depends upon its position in a number.

Each digit is 10 times higher than the digit to the right. This applies to decimal fractions as well as to whole numbers.

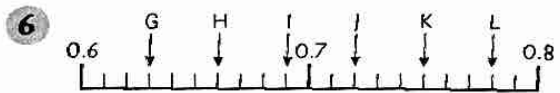
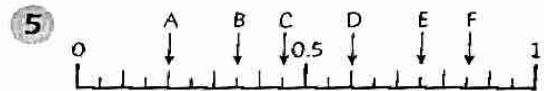
T	U	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
70 =	7	0	.	0	
7 =	7	.	0		
$\frac{7}{10}$ =	0	.	7		
$\frac{7}{100}$ =	0	.	0	7	
$\frac{7}{1000}$ =	0	.	0	0	7

**A**

Express the shaded part of each diagram as a fraction and as a decimal fraction.



Write each number shown by the arrows as a decimal fraction.



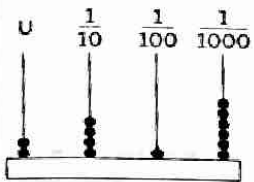
Give the value of the underlined figure in each of these numbers.

- |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|
| <b>7</b> 16- <u>8</u>    | <b>11</b> 0-0 <u>6</u>   | <b>15</b> 2-0 <u>3</u>   |
| <b>8</b> 9-5 <u>2</u>    | <b>12</b> 3- <u>2</u> 9  | <b>16</b> 9- <u>1</u> 7  |
| <b>9</b> 24- <u>7</u> 6  | <b>13</b> 58- <u>3</u> 6 | <b>17</b> 0-8 <u>3</u> 1 |
| <b>10</b> 1 <u>5</u> -43 | <b>14</b> 8- <u>5</u>    | <b>18</b> 12- <u>6</u> 2 |

Give the next five terms in each of these sequences.

- 19** 0.01, 0.03, 0.05, 0.07, 0.09
- 20** 1.01, 1.02, 1.03, 1.04, 1.05
- 21** 0.9, 0.92, 0.94, 0.96, 0.98
- 22** 1.6, 1.65, 1.7, 1.75, 1.8

**B**

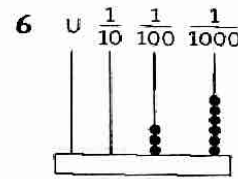
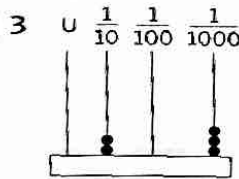
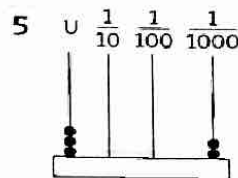
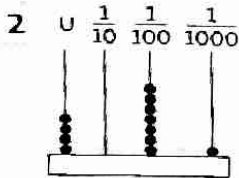
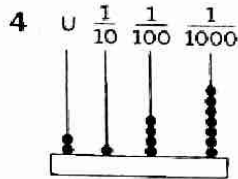
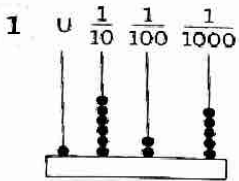


**Example**

$$2 + \frac{4}{10} + \frac{1}{100} + \frac{6}{1000}$$

$$2 \frac{416}{1000} = 2.416$$

Write the decimal fraction shown on each abacus.



Write these numbers as decimal fractions.

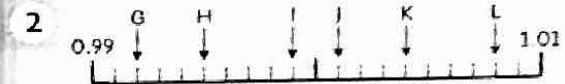
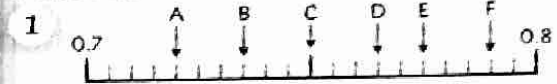
- |                        |                       |                        |
|------------------------|-----------------------|------------------------|
| 7 $\frac{1}{100}$      | 11 $9\frac{7}{100}$   | 15 $8\frac{254}{1000}$ |
| 8 $2\frac{76}{100}$    | 12 $\frac{43}{1000}$  | 16 $72\frac{4}{100}$   |
| 9 $\frac{397}{1000}$   | 13 $\frac{6}{1000}$   | 17 $5\frac{3}{1000}$   |
| 10 $4\frac{821}{1000}$ | 14 $3\frac{74}{1000}$ | 18 $26\frac{26}{1000}$ |

Give the value of the underlined figure in each of these numbers.

- |                   |                    |                   |
|-------------------|--------------------|-------------------|
| 19 <u>6</u> .34   | 23 18. <u>1</u> 96 | 27 <u>3</u> 6.078 |
| 20 12. <u>8</u> 5 | 24 1.0 <u>3</u> 5  | 28 4. <u>3</u> 4  |
| 21 <u>6</u> .427  | 25 0. <u>7</u> 08  | 29 4. <u>2</u> 22 |
| 22 <u>1</u> 5.8   | 26 15. <u>9</u> 2  | 30 0. <u>5</u> 16 |

**C**

Write each number shown by the arrows as a decimal fraction.



Increase the following numbers by:

- |                |                 |                  |
|----------------|-----------------|------------------|
| $\frac{1}{10}$ | $\frac{1}{100}$ | $\frac{1}{1000}$ |
| 3 3            | 7 7.29          | 11 3.289         |
| 4 2.941        | 8 1.2           | 12 5             |
| 5 5.9          | 9 6             | 13 0.3           |
| 6 8.03         | 10 0.096        | 14 4.999         |

Give the next five terms in each of these sequences.

- 15 0.592, 0.593, 0.594, 0.595, 0.596  
 16 0.06, 0.065, 0.07, 0.075, 0.08  
 17 2.99, 2.992, 2.994, 2.996, 2.998  
 18 1.02, 1.016, 1.012, 1.008, 1.004

Copy and complete.

- 19  $1.683 + 0.05 = \square$   
 20  $5.134 - 0.009 = \square$   
 21  $2.791 + 0.8 = \square$   
 22  $1.482 - 0.6 = \square$   
 23  $3.164 + 0.07 = \square$   
 24  $3.261 - 0.08 = \square$   
 25  $0.72 + \square = 0.743$   
 26  $1.298 - \square = 0.898$   
 27  $3.592 + \square = 3.612$   
 28  $2.793 - \square = 2.788$   
 29  $0.063 + \square = 0.123$   
 30  $9.487 - \square = 9.478$

On this page you will learn to order a set of decimals.

Write the set of decimals in a line with the decimal points in a column.  
Fill in any empty spaces with zeros. This makes it easier to compare the decimals.

### Example

Write 1.41, 1.4, 1.141, 1 in ascending order.

Write in column.	Put in zeros.	Arrange in order.
1.41	1.410	1
1.4	1.400	1.141
1.141	1.141	1.4
1	1.000	1.41

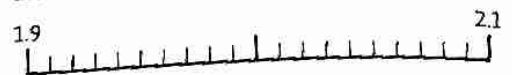
### A

Copy and complete by writing  $<$  or  $>$  in the box.

- 1 5.88  8.5      5 2.71  1.72  
 2 4.2  4.9      6 9.58  9.8  
 3 6.7  6.37      7 8.37  8.73  
 4 3.46  4.36      8 5.31  5.13

9 Copy the line and locate the numbers.

2.0 2.03 2.05 1.95 1.97 2.07



### B

Arrange these decimals in ascending order.

- 1 6.29, 0.69, 0.609, 6.09  
 2 5.227, 2.257, 5.27, 2.57  
 3 9.123, 9.23, 0.923, 92.3  
 4 8.77, 8.272, 2.788, 2.87

5 Copy the line and locate the numbers.

1.98 1.935 1.99  
 1.965 1.915 1.95



### C

Arrange these decimals in ascending order.

- 1 5.656, 55.65, 5.56, 5.556, 5.66  
 2 4.944, 4.99, 4.9, 4.499, 4.494  
 3 0.781, 1.7, 0.187, 0.178, 0.71  
 4 2.303, 0.322, 2.033, 2.32, 0.33  
 5 2.222, 2.2, 22.22, 22.2, 2.22  
 6 1.414, 1.144, 14.14, 1.114, 1.44  
 7 6.606, 6.66, 6.066, 60.6, 6.06  
 8 1.771, 1.717, 1.177, 1.17, 1.7  
 9 Draw a line from 0.99 to 1.01 with 20 divisions. Show these numbers on your line.

1.00 0.995 1.002 1.006 0.992 1.008

# ROUNDING DECIMALS

On this page you will learn to round decimals to the nearest number or tenth.

To round a decimal fraction to the nearest whole number look at the tenths column.

To round a decimal fraction to the nearest tenth look at the hundredths column.

If the number in that column is less than 5, round down.

If the number in that column is greater than 5, round up.

## Examples

To the nearest whole number, 3.5 rounds to 4

5.49 rounds to 5

To the nearest tenth,

2.61 rounds to 2.6

4.372 rounds to 4.4.

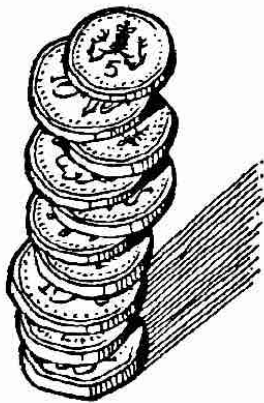
### A

Round to the nearest whole number.

- |        |          |
|--------|----------|
| 1 10.4 | 7 17.6   |
| 2 1.7  | 8 9.47   |
| 3 7.5  | 9 12.3   |
| 4 4.23 | 10 11.51 |
| 5 8.25 | 11 14.28 |
| 6 0.83 | 12 3.61  |

Round to the nearest pound.

- |           |           |
|-----------|-----------|
| 13 £6.70  | 19 £2.09  |
| 14 £2.40  | 20 £1.37  |
| 15 £5.50  | 21 £0.85  |
| 16 £12.26 | 22 £3.44  |
| 17 £4.91  | 23 £11.52 |
| 18 £10.73 | 24 £8.65  |



### B

Round to the nearest:

- |         |          |
|---------|----------|
| 1       | 0.1      |
| 1 16.48 | 6 1.249  |
| 2 8.943 | 7 10.66  |
| 3 17.37 | 8 0.152  |
| 4 4.539 | 9 2.58   |
| 5 13.75 | 10 5.873 |

- |          |           |
|----------|-----------|
| £1       | 10p       |
| 11 £2.67 | 16 £5.73  |
| 12 £0.26 | 17 £0.26  |
| 13 £7.53 | 18 £8.05  |
| 14 £3.85 | 19 £16.34 |
| 15 £1.04 | 20 £4.98  |

- |           |           |
|-----------|-----------|
| 1 m       | 10 cm     |
| 21 8.60 m | 26 9.04 m |
| 22 2.28 m | 27 1.46 m |
| 23 5.47 m | 28 4.55 m |
| 24 0.93 m | 29 8.63 m |
| 25 7.52 m | 30 2.97 m |

### C

- 1 Copy the table rounding the kilograms to the nearest 100 g.

Pounds	Kilograms
1	0.454
2	0.907
3	1.361
4	1.814
5	2.268
6	2.722
7	3.175
8	3.629
9	4.082

- 2 Copy the table rounding the litres to the nearest 100 ml.

Gallons	Litres
1	4.546
2	9.092
3	13.638
4	18.184
5	22.730
6	27.276
7	31.822
8	36.368
9	40.914

On this page you will learn to recognise equivalent fractions and decimals.

It is important to remember that:

$$\begin{array}{lll} \frac{1}{10} = 0.1 & \frac{2}{10} = 0.2 & \frac{3}{10} = 0.3 \text{ and so on.} \\ \frac{1}{100} = 0.01 & \frac{2}{100} = 0.02 & \frac{3}{100} = 0.03 \text{ and so on.} \\ \frac{1}{1000} = 0.001 & \frac{2}{1000} = 0.002 & \frac{3}{1000} = 0.003 \text{ and so on.} \\ \frac{1}{2} = 0.5 & \frac{1}{4} = 0.25 & \frac{3}{4} = 0.75 \end{array}$$

## A

Write True or False for each of the following statements.

- 1  $\frac{82}{100} = 0.08$
- 2  $\frac{7}{10} = 0.07$
- 3  $\frac{1}{4} = 0.25$
- 4  $\frac{1}{100} = 0.01$
- 5  $\frac{3}{4} = 0.34$
- 6  $\frac{1}{10} = 0.1$
- 7  $\frac{94}{100} = 0.94$
- 8  $\frac{1}{2} = 0.2$
- 9  $0.001 = \frac{1}{1000}$
- 10  $0.003 = \frac{3}{100}$
- 11  $0.2 = \frac{1}{2}$
- 12  $0.09 = \frac{9}{100}$
- 13  $0.521 = \frac{521}{1000}$
- 14  $0.23 = \frac{23}{1000}$
- 15  $0.75 = \frac{3}{4}$
- 16  $0.6 = \frac{6}{10}$

- 17 Match each of these fractions with one of these decimals.

$\frac{2}{10}$	0.5
$\frac{5}{100}$	0.75
$\frac{1}{2}$	0.05
$\frac{3}{10}$	0.3
$\frac{3}{4}$	0.55
$\frac{55}{100}$	0.2

## B

Write as fractions.

- 1 2.72
- 2 0.692
- 3 7.75
- 4 3.427
- 5 1.05
- 6 6.081
- 7 3.9
- 8 5.006

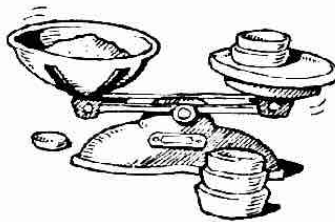
Write as decimals.

- 9 £2  $\frac{63}{100}$
- 10 £5  $\frac{9}{10}$
- 11 £7  $\frac{1}{4}$
- 12 £9  $\frac{7}{100}$
- 13 4  $\frac{129}{1000}$  km
- 14 2  $\frac{3}{4}$  km
- 15 6  $\frac{3}{10}$  cm
- 16 1  $\frac{38}{1000}$  km

Give the answer as a decimal.

- 17  $0.38 + \frac{1}{4}$
- 18  $\frac{1}{2} - 0.24$
- 19  $\frac{3}{5} + 0.2$
- 20  $0.73 - \frac{4}{10}$
- 21  $0.6 + \frac{23}{100}$
- 22  $\frac{3}{4} - 0.6$

- 23 Write a decimal in the box. '2  $\frac{3}{5}$  kg of sugar is  kg.'



## C

Write as fractions.

- 1 8.54
- 2 3.692
- 3 6.06
- 4 0.7
- 5 11.025
- 6 1.25
- 7 9.001
- 8 15.85
- 9 4.247
- 10 7.02
- 11 2.031
- 12 19.006

Write as decimals.

- 13  $\frac{75}{1000}$
- 14  $2 \frac{4}{1000}$
- 15  $3 \frac{19}{50}$
- 16  $2 \frac{17}{20}$
- 17 £  $\frac{17}{100}$
- 18 £9  $\frac{11}{25}$
- 19 £1  $\frac{12}{20}$
- 20 £3  $\frac{2}{5}$
- 21  $2 \frac{7}{20}$  m
- 22  $1 \frac{4}{5}$  cm
- 23  $\frac{16}{25}$  m
- 24  $5 \frac{49}{50}$  km

Write in ascending order.

- 25  $\frac{1}{4}$ , 0.144, 0.41
- 26 0.85,  $\frac{4}{5}$ ,  $\frac{5}{8}$
- 27  $\frac{7}{20}$ ,  $\frac{207}{1000}$ , 0.27
- 28 0.408,  $\frac{48}{100}$ , 0.084
- 29  $\frac{499}{1000}$ , 0.49,  $\frac{4}{9}$
- 30 0.503,  $\frac{3}{5}$ , 0.53
- 31 A full box of cereal contains  $\frac{17}{40}$  kg. At breakfast 0.15 kg is used. How much cereal is left in the box?



# FRACTIONS OF QUANTITIES

On this page you will learn to find a fraction of a number or quantity.

**Examples**

$$\frac{1}{7} \text{ of } 420 = 420 \div 7 = 60$$

$$\frac{5}{8} \text{ of } 640 = (640 \div 8) \times 5 = 80 \times 5 = 400$$

To find what fraction one quantity is of another, make a fraction by putting one quantity over the other.

TAKE CARE! The units of the two quantities must be the same.

**Examples**

What fraction of £2 is 35p?

Answer =  $\frac{35}{200} = \frac{7}{40}$ , because £2 = 200p.

What fraction of one metre is 25 cm?

Answer =  $\frac{25}{100} = \frac{1}{4}$ , because 1 m = 100 cm.

What fraction of one litre is 200 ml?

Answer =  $\frac{200}{1000} = \frac{1}{5}$ , because 1 litre = 1000 ml.



**A**

Find  $\frac{1}{10}$  of:

- 1 700      4 5 m
- 2 280      5 £2
- 3 1 m      6 £3

Find  $\frac{7}{10}$  of:

- 7 40      10 1 m
- 8 20      11 £1
- 9 60 cm      12 £5

Find  $\frac{1}{8}$  of:

- 13 32      16 56 m
- 14 72      17 40p
- 15 24 cm      18 64p

Find  $\frac{3}{4}$  of:

- 19 32      22 36 cm
- 20 24      23 £1
- 21 1 m      24 60p

**B**

Find

- 1  $\frac{3}{5}$  of 40      7  $\frac{63}{1000}$  of 1 kg
- 2  $\frac{5}{9}$  of 270      8  $\frac{3}{10}$  of 3 kg
- 3  $\frac{9}{10}$  of 600      9  $\frac{5}{6}$  of 480 g
- 4  $\frac{7}{10}$  of 5 m      10  $\frac{4}{5}$  of 1 l
- 5  $\frac{29}{100}$  of 2 m      11  $\frac{6}{7}$  of 42 l
- 6  $\frac{9}{1000}$  of 1 m      12  $\frac{19}{100}$  of 3 l

What fraction of £1 is:

- 13 20p      15 75p
- 14 5p      16 4p?

What fraction of 1 litre is:

- 17 79 ml      19 250 ml
- 18 310 ml      20 10 ml?

What fraction of 1 metre is:

- 21 5 cm      23 60 cm
- 22 12 cm      24 35 cm?

**C**

Find

- 1  $\frac{7}{8}$  of 200      7  $\frac{3}{5}$  of 6 kg
- 2  $\frac{4}{5}$  of 120      8  $\frac{57}{100}$  of 4 kg
- 3  $\frac{7}{9}$  of 3600      9  $\frac{7}{10}$  of 4 kg
- 4  $\frac{3}{10}$  of 4.2 m      10  $\frac{17}{100}$  of 5 l
- 5  $\frac{19}{20}$  of 4 m      11  $\frac{4}{50}$  of 2 l
- 6  $\frac{11}{1000}$  of 7 m      12  $\frac{19}{1000}$  of 5 l

What fraction of £1 is:

- 13 17p      15 £0.15
- 14 65p      16 £0.02?

What fraction of 1 litre is:

- 17 5 ml      19 220 ml
- 18 125 ml      20 1 ml?

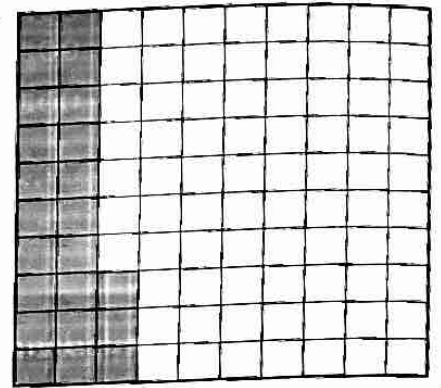
What fraction of 1 metre is:

- 21 2 cm      23 75 cm
- 22 2 mm      24 1 mm?

On these pages you will learn:

- to understand percentage as the number of parts in 100.

Per cent means out of 100.  
 Percentages are fractions with a denominator of 100.  
 The symbol used for per cent is %.



23 small squares are shaded.  
 The fraction shaded =  $\frac{23}{100}$ .  
 The percentage shaded = 23%.

- to recognise when percentages, decimals and fractions are equal.

To express fractions as percentages, change them to equivalent fractions with denominators of 100.

**Examples**

$\frac{3}{10} = \frac{30}{100} = 30\%$        $\frac{1}{2} = \frac{50}{100} = 50\%$

To express decimals as percentages, multiply by 100.

**Examples**

$0.53 = 53\%$        $0.2 = 20\%$

You need to know that:

$1 = \frac{100}{100} = 1.0 = 100\%$

$\frac{1}{10} = \frac{10}{100} = 0.1 = 10\%$

$\frac{1}{5} = \frac{20}{100} = 0.2 = 20\%$

$\frac{1}{100} = \frac{1}{100} = 0.01 = 1\%$

$\frac{1}{4} = \frac{25}{100} = 0.25 = 25\%$

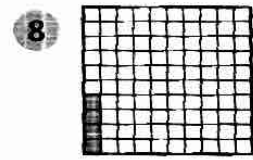
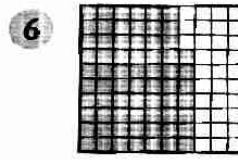
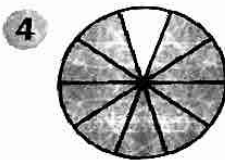
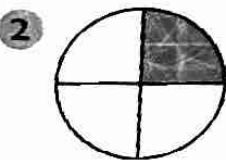
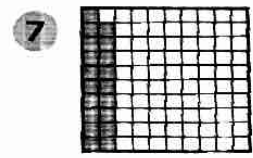
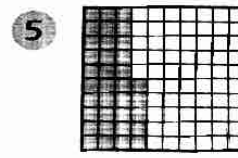
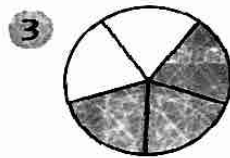
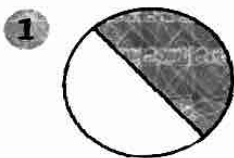
$\frac{1}{2} = \frac{50}{100} = 0.5 = 50\%$

$\frac{3}{4} = \frac{75}{100} = 0.75 = 75\%$

**A**

Express each shaded area as:

- a) a fraction      b) a decimal      c) a percentage.



- 9 What percentage of the 20 boxes contain:  
 a) ticks      b) crosses      c) circles?

- 10 What percentage of the 20 boxes are blank?

✓		X		✓
✓	X	✓	X	✓
✓	○	✓	○	✓
✓	X	○	X	✓

B

1 Copy and complete the table.

Fractions	$\frac{3}{10}$								$\frac{3}{100}$	$\frac{11}{50}$	$\frac{7}{20}$	$\frac{3}{25}$
Decimals	0.3				0.04	0.6	0.5	0.83				
Percentages	30%	26%	25%	70%								

What percentage could be used in each of these sentences?

- 2 Fay scored 38 out of 50 in her History Test.
- 3 Two fifths of the children in the class have fair hair.
- 4 Seven in every ten voters supported the winning candidate.
- 5 Half the chocolates in the box have hard centres.
- 6 The football team won 12 out of the 25 matches played.
- 7 Two in every hundred mothers gave birth to twins.
- 8 Michael Owen was on target with 4 out of his 5 shots at goal.
- 9 Three quarters of the audience were women.
- 10 It rained on eleven days in every twenty.



C

Write each fraction as:

- a) a decimal
- b) a percentage

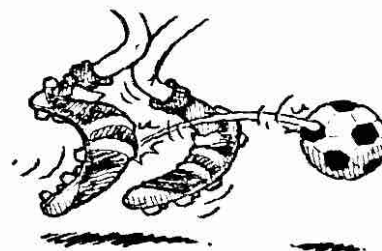
- |                   |                    |                     |                      |        |        |        |          |
|-------------------|--------------------|---------------------|----------------------|--------|--------|--------|----------|
| 1 $\frac{9}{10}$  | 3 $\frac{3}{5}$    | 5 $\frac{7}{25}$    | 7 $\frac{9}{20}$     | 9 62%  | 11 15% | 13 64% | 15 12.5% |
| 2 $\frac{23}{50}$ | 4 $\frac{78}{100}$ | 6 $\frac{198}{200}$ | 8 $\frac{470}{1000}$ | 10 30% | 12 43% | 14 60% | 16 2.5%  |

Write each percentage as:

- a) a fraction in its simplest form
- b) a decimal.

17 The girls' football team had a penalty competition. Copy and complete the table.

Name	Penalties	Goals	Scored (%)	Missed (%)
Leslie	25	16		
Kirsty	24	15		
Megan	20	13		
Stacey	30		70%	
Carly	36		75%	
Judy	26			50%
Fay	25			40%



- 18 Use squared paper. Draw an  $8 \times 5$  grid of 40 boxes.
  - a) Put ticks in 25% of the boxes.
  - b) Put crosses in 40% of the boxes.
  - c) Put circles in 15% of the boxes.

On this page you will learn to find percentages of numbers.

### Examples

$$75\% \text{ of } 60 = \frac{3}{4} \text{ of } 60$$

$$\frac{1}{4} \text{ of } 60 = 15$$

$$\frac{3}{4} \text{ or } 75\% \text{ of } 60 = 45$$

$$30\% \text{ of } 40 = \frac{3}{10} \text{ of } 40$$

$$\frac{1}{10} \text{ of } 40 = 4$$

$$\frac{3}{10} \text{ or } 30\% \text{ of } 40 = 12$$

### A

Work out

- 1 10% of 70
- 2 50% of 42
- 3 25% of 24
- 4 10% of 150
- 5 20% of 35
- 6 30% of 160
- 7 75% of 60
- 8 40% of 30
- 9 10% of 130
- 10 50% of 500
- 11 20% of 250
- 12 25% of 40
- 13 20% of 15
- 14 30% of 400
- 15 40% of 50
- 16 75% of 120
- 17 There were 130 apples in a barrel. 10% were rotten. How many apples were rotten?
- 18 25% of the 240 passengers on a plane had not flown before. How many passengers had flown before?

### B

Work out

- 1 10% of 55
- 2 20% of 180
- 3 25% of 96
- 4 40% of 22
- 5 50% of 19
- 6 30% of 140
- 7 1% of 430
- 8 70% of 60
- 9 20% of 85
- 10 75% of 320
- 11 80% of 110
- 12 1% of 37
- 13 60% of 120
- 14 90% of 150
- 15 1% of 2000
- 16 5% of 50
- 17 A baker made 64 cakes. 75% were sold. How many cakes were left?
- 18 There are 180 children in a school. 30% have milk every day. How many children do not have milk?

### C

- 1 There were 240 children in a school. 60% were boys. How many girls were there?
- 2 75% of the children in a class could swim. This was 21 children. How many children were there in the class?
- 3 30% of the children in Year 6 belonged to the Guitar Club. This was 12 children. How many children were in Year 6?
- 4 Ian weighed 60 kg. His weight increased by 5%. What was his new weight?
- 5 A test had 80 questions. Amy correctly answered 85%. How many questions did she not answer correctly?
- 6 There were 300 children at a concert. 45% were girls. How many were boys?

# RATIO AND PROPORTION

On this page you will solve simple problems involving ratio and proportion.

## A

A department store's loyalty card entitles the customer to a discount of one pound in every £50 spent. Copy and complete the table.

1	Amount spent (£s)	50	100	150							
	Discount (£s)	1			4	5	6	7	8	9	10

2 Make a similar table for a discount of £1 in every £30 spent.

## B

Copy and complete these sentences for each of the patterns below. Write both sentences for each pattern.

1       3       5 

2       4       6 

- a) The ratio of shaded squares to white squares is  to every .
- b) The proportion of shaded squares in the pattern is . (Write a fraction.)

## C

- 1 There are nine girls to every four boys at a swimming pool. There are 16 boys at the pool. How many girls are there?
- 2 For every five adults on a bus there are three children. There are 21 children on the bus. How many adults are there?
- 3 400 people attend a concert. There are seven children to every three adults. How many children are at the concert?
- 4 One in every thirty raffle tickets won a prize. There were 600 tickets sold. How many tickets won prizes?
- 5 In a test Rachel answered seven questions correctly to every five she answered wrongly. There were 60 questions in the test. How many did she get right?
- 6 There are 36 chocolates in a box. Four in every nine have soft centres. How many chocolates have hard centres?
- 7 In an orchard there are 5 times as many apple trees as there are pear trees. There are 300 trees in the orchard altogether. How many pear trees are there?
- 8 A jeweller mends 7 watches for every 2 he sells. In one month he mends 56 watches. How many does he sell?



On these pages you will learn:

- to find percentages of amounts of money.

### Examples

$$90\% \text{ of } \pounds 6.00 = \frac{9}{10} \text{ of } \pounds 6.00$$

$$\frac{1}{10} \text{ of } \pounds 6.00 = 60\text{p}$$

$$\frac{9}{10} \text{ or } 90\% \text{ of } \pounds 6.00 = \pounds 5.40$$

- to find percentages by halving.

### Example

Find 62.5% of £500

$$100\% \text{ of } \pounds 500 = \pounds 500$$

$$50\% \text{ of } \pounds 500 = \pounds 250$$

$$25\% \text{ of } \pounds 500 = \pounds 125$$

$$12.5\% \text{ of } \pounds 500 = \pounds 62.50$$

$$62.5\% \text{ of } \pounds 500 = \pounds 250 + \pounds 62.50 \\ = \pounds 312.50$$


## A

For each of the following items in a sale, find:

- the amount the price is reduced.
- the new price.



1 SUITS  
£100.00  
10% OFF



5 TROUSERS  
£15.00  
20% OFF

9 COATS  
£40.00  
25% OFF


2 GLOVES  
£5.00  
50% OFF

6 TIES  
£3.60  
10% OFF



10 SHIRTS  
£10.00  
40% OFF

3 SOCKS  
£2.40  
25% OFF



7 TRAINERS  
£20.00  
30% OFF

11 SHOES  
£25.00  
20% OFF

4 BELTS  
£8.50  
10% OFF

8 HATS  
£8  
20% OFF

12 SCARVES  
£6.00  
25% OFF

Work out 75% of the following amounts of money by halving.

13 £1.20

14 40p

15 £30.00

16 92p

17 £2.20

18 £68.00

B

Copy and complete the table.

Item	Price	Sale price 10% Discount	Sale price 5% Discount	Sale price 20% Discount	Sale price 30% Discount
Tennis racket	£30.00	£27.00			
Tennis balls	£3.60				
Football	£18.00				
Laces	£1.20				
Snooker table	£240.00				
Chalk	40p				
Cricket ball	£6.40				
Stumps		£8.10			

Work out 12.5% of the following amounts of money by halving.

- 2 72p    3 £10.00    4 £1.20    5 £3.60    6 £25.20    7 £12.24

C

Find the odd one out in each set.

- 1 40% of 75p    2 5% of £8.40    3 20% of £3.20    4 5% of £3.80  
 10% of £30    6% of £7.00    1% of £32.00    2% of £9.50  
 3% of £10    25% of £1.60    32% of £2.00    20% of 90p

5 Copy and complete the table.

PRICE	SALE PRICE 15% DISCOUNT
£10.00	£8.50
£0.60	
£250.00	
£4.80	
£180.00	
£15.00	
£3.40	
£8.00	
£220.00	
£16.00	

6 Value Added Tax (VAT) is charged on many items at  $17\frac{1}{2}\%$ .  $17\frac{1}{2}\%$  can be calculated by halving.

**Example**

$17\frac{1}{2}\%$  of £500.00

10% of £500 = £50.00

5% of £500 = £25.00

$2\frac{1}{2}\%$  of £500 = £12.50

$17\frac{1}{2}\%$  of £500 = £87.50

Use this method to find  $17\frac{1}{2}\%$  of:

- a) £60.00    d) £76.00  
 b) £10.80    e) £124.00  
 c) £4.40    f) £15.20

# PRICES SLASHED

On this page you will learn to understand the vocabulary and operation of addition.

2175 + 396 can be expressed in different ways.

the sum of 2175 and 396

2175 add 396

the total of 2175 and 396

2175 plus 396

2175 and 396 added together

396 greater than 2175

2175 increased by 396

396 more than 2175.

### A

Work out

- 1 67 plus 67.
- 2 234 add 48.
- 3 The sum of 1.6 and 1.7.
- 4 148 increased by 71.
- 5 500 more than 837.
- 6 The total of 168 and 96.
- 7 629 and 240 added together.
- 8 170 greater than 180.
- 9 59 added to 256.
- 10 428 plus 350.
- 11 48 increased by 46.
- 12 400 greater than 713.

### B

Copy and complete by writing the missing number in the box.

- 1 The total of 2.73 and  $\square$  is 3.
- 2 0.36 greater than  $\square$  is 0.96.
- 3 4600 add  $\square$  is 8200.
- 4 3700 plus  $\square$  is 5500.
- 5  $\square$  more than 6.71 is 6.8.
- 6  $\square$  and 2.4 added together is 5.69.
- 7 5.43 increased by  $\square$  is 5.5.
- 8 The sum of 3.48 and  $\square$  is 4.
- 9 3600 added to  $\square$  is 7100.
- 10 The total of 0.35 and  $\square$  is 0.65.
- 11 0.29 greater than  $\square$  is 0.79.
- 12  $\square$  plus 3.1 is 9.5.

### C

Copy and complete by writing the missing number in the box.

- 1  $1.759 + \square = 2$
  - 2  $6700 + \square = 12300$
  - 3  $\square + 0.043 = 1.2$
  - 4  $7800 + \square = 15200$
  - 5  $2.183 + \square = 2.19$
  - 6  $\square + 0.035 = 1$
  - 7  $3.564 + \square = 3.6$
  - 8  $6900 + \square = 11400$
  - 9  $\square + 0.382 = 4$
  - 10  $0.683 + \square = 0.7$
  - 11  $0.154 + \square = 0.16$
  - 12  $\square + 5600 = 13200$
- 13 Find all the different totals you can make using three of these five numbers.

0.703

0.73

0.3

30.7

7.37



# UNDERSTANDING SUBTRACTION

31

On this page you will learn to understand the vocabulary and operation of subtraction.

SUBTRACTION IS:

TAKING AWAY.

7 take away 3.

7 subtract 3.

7 decreased by 3.

FINDING A DIFFERENCE.

The difference between 7 and 3.

How many more is 7 than 3?

How many less is 3 than 7?

THE INVERSE OF ADDITION.

Find the missing number.  $\square - 0.39 = 0.4$

The answer is 0.79 because  $0.4 + 0.39 = 0.79$ .

## A

Work out

- 1 Take 0.7 from 1.
- 2 601 subtract 395.
- 3 41 less than 896.
- 4 5 decreased by 4.6.
- 5 1438 take away 500.
- 6 Subtract 2.7 from 6.4.
- 7 420 less than 756.
- 8 6005 take 4997.
- 9 Decrease 540 by 280.
- 10 10 subtract 4.8.
- 11 0.35 less than 0.83.
- 12 353 take away 29.

## B

Copy and complete by writing the missing number in the box.

- 1  $\square$  take 0.6 is 0.24.
- 2 7000 take  $\square$  is 3146.
- 3  $\square$  decreased by 0.4 is 0.06.
- 4 0.8 decreased by  $\square$  is 0.46.
- 5  $\square$  is 2600 less than 4200.
- 6 2.3 is  $\square$  more than 1.4.
- 7  $\square$  subtract 0.48 is 0.1.
- 8 8200 subtract  $\square$  is 3700.
- 9  $\square$  take away 0.23 is 0.7.
- 10 6 take away  $\square$  is 0.63.
- 11  $\square$  is 800 more than 3700.
- 12 6.7 is  $\square$  more than 2.1.

## C

Find the difference between these numbers and the target number.

Copy and complete.

- |        |         |          |                              |                              |
|--------|---------|----------|------------------------------|------------------------------|
| 10     | 1       | 0.49     | 13 $\square - 2800 = 7600$   | 18 $0.621 - \square = 0.321$ |
| 1 5.8  | 5 0.28  | 9 1.65   | 14 $0.118 - \square = 0.098$ | 19 $\square - 8700 = 3400$   |
| 2 9.19 | 6 0.523 | 10 5.72  | 15 $\square - 0.4 = 0.318$   | 20 $0.547 - \square = 0.337$ |
| 3 4.76 | 7 0.918 | 11 3.8   | 16 $12300 - \square = 5800$  | 21 $\square - 0.417 = 0.583$ |
| 4 1.32 | 8 0.761 | 12 0.513 | 17 $\square - 0.36 = 0.029$  | 22 $14200 - \square = 6600$  |

On this page you will learn to find a difference by counting up through the next multiple of 10, 100 or 1000.

### Examples

$$403 - 186 = 4 + 10 + 200 + 3 = 217$$

$$7003 - 3995 = 5 + 3000 + 3 = 3008$$

$$8000 - 2785 = 5 + 10 + 200 + 5000 = 5215$$

### A

Work out

- 1  $604 - 396$
- 2  $706 - 299$
- 3  $908 - 569$
- 4  $803 - 285$
- 5  $6000 - 2994$
- 6  $5000 - 1976$
- 7  $8000 - 5963$
- 8  $7000 - 2959$
- 9  $6007 - 3995$
- 10  $9003 - 4998$

### B

Work out

- 1  $801 - 587$
- 2  $726 - 169$
- 3  $635 - 272$
- 4  $542 - 184$
- 5  $8000 - 3887$
- 6  $6000 - 3655$
- 7  $6007 - 2984$
- 8  $9008 - 4963$
- 9  $7014 - 4995$
- 10  $8016 - 2979$

### C

Copy and complete.

- 1  $8100 - \square = 2776$
- 2  $7200 - \square = 3892$
- 3  $6300 - \square = 3765$
- 4  $9100 - \square = 4688$
- 5  $9300 - \square = 4855$
- 6  $7400 - \square = 3764$
- 7  $8200 - \square = 2687$
- 8  $6200 - \square = 2768$
- 9  $7050 - \square = 1940$
- 10  $6040 - \square = 2960$

Now you will learn to identify near doubles.

### Examples

$$317 + 284 = (300 \times 2) + 17 - 16 = 600 + 1 = 601$$

$$20.4 + 19.7 = (20 \times 2) + 0.4 - 0.3 = 40 + 0.1 = 40.1$$

### A

Work out

- 1  $46 + 53$
- 2  $57 + 61$
- 3  $79 + 84$
- 4  $68 + 72$
- 5  $29 + 32$
- 6  $65 + 73$
- 7  $3.5 + 3.7$
- 8  $2.2 + 2.4$
- 9  $4.5 + 4.4$
- 10  $4.1 + 3.8$

### B

Work out

- 1  $302 + 294$
- 2  $413 + 391$
- 3  $387 + 415$
- 4  $484 + 522$
- 5  $197 + 206$
- 6  $492 + 516$
- 7  $2.7 + 2.8$
- 8  $4.9 + 4.8$
- 9  $5.4 + 4.7$
- 10  $6.2 + 5.9$

### C

Copy and complete.

- 1  $\square - 19.6 = 20.7$
- 2  $\square - 50.8 = 49.5$
- 3  $\square - 25.6 = 24.8$
- 4  $\square - 31.4 = 29.3$
- 5  $\square - 18.7 = 21.6$
- 6  $\square - 41.2 = 39.9$
- 7  $\square - 38.5 = 42.9$
- 8  $\square - 38.3 = 42.5$
- 9  $\square - 34.7 = 35.6$
- 10  $\square - 57.8 = 61.3$

## MENTAL STRATEGIES (+ AND -)

33

On this page you will learn to add or subtract to the nearest whole number and adjust.

### Examples

$$4.5 + 3.9 = 4.5 + 4.0 - 0.1 = 8.5 - 0.1 = 8.4$$

$$7.8 - 2.9 = 7.8 - 3.0 + 0.1 = 4.8 + 0.1 = 4.9$$

$$4.3 - 2.1 = 4.3 - 2.0 - 0.1 = 2.3 - 0.1 = 2.2$$

### A

Work out

- 1  $1.5 + 0.9$
- 2  $6.2 - 0.9$
- 3  $7.1 + 1.1$
- 4  $3.9 - 1.1$
- 5  $2.3 + 0.9$
- 6  $4.5 - 0.9$
- 7  $3.5 + 1.1$
- 8  $2.6 - 1.1$
- 9  $4.8 + 0.9$
- 10  $5.4 - 0.9$

### B

Work out

- 1  $1.6 + 0.9$
- 2  $7.3 - 1.9$
- 3  $6.8 + 2.1$
- 4  $7.6 - 1.1$
- 5  $3.7 + 2.9$
- 6  $6.4 - 0.9$
- 7  $3.7 + 4.1$
- 8  $3.3 - 3.1$
- 9  $4.8 + 3.9$
- 10  $5.5 - 2.9$

### C

Copy and complete.

- 1  $\square - 19.6 = 20.7$
- 2  $\square - 50.8 = 49.6$
- 3  $\square - 40.4 = 39.2$
- 4  $\square - 29.3 = 31.4$
- 5  $\square - 21.6 = 18.7$
- 6  $\square - 48.3 = 52.1$
- 7  $\square - 38.5 = 42.9$
- 8  $\square - 42.5 = 38.3$
- 9  $\square - 71.2 = 68.7$
- 10  $\square - 57.8 = 61.3$

Now you will learn to use the relationship between addition and subtraction.

If you know one addition or subtraction fact you can state three other related facts.

### Example

$$3.32 - 2.53 = 0.79 \quad 3.32 - 0.79 = 2.53$$

$$2.53 + 0.79 = 3.32 \quad 0.79 + 2.53 = 3.32$$

### A

Copy and complete. Use the 3 given numbers only.

- 1  $67 + 74 = 141$   
 $74 + \square = \square$   
 $141 - \square = \square$   
 $\square - \square = \square$
- 2  $4.7 + 1.1 = \square$   
 $\square + \square = \square$   
 $\square - \square = 1.1$   
 $5.8 - \square = \square$
- 3  $153 + 27 = \square$   
 $\square + \square = 180$   
 $\square - 27 = \square$   
 $\square - \square = \square$

### B

Work out and write three other related facts.

- 1  $1.64 + 3.9$
- 2  $5.7 - 3.1$
- 3  $3.7 + 5.9$
- 4  $6.8 - 2.4$
- 5  $0.07 + 0.3$
- 6  $2001 - 240$
- 7  $3016 + 1994$
- 8  $4007 - 1983$
- 9  $6004 + 2997$
- 10  $9200 - 5800$

### C

For each set of numbers write four related + or - facts.

- 1 3.6, 5.47, 9.07
- 2 3.4, 1.7, 5.1
- 3 4003, 1022, 2981
- 4 2986, 6021, 3007
- 5 3.8, 6.51, 2.71
- 6 6.4, 3.8, 2.6
- 7 2965, 4049, 7014
- 8 9048, 3975, 5023
- 9 2.83, 6.6, 3.77
- 10 4.54, 0.56, 5.1

On this page you will learn to use a variety of strategies to add several numbers.

**Examples**

Look for pairs that make multiples of 10 or 100.

$$\begin{aligned} 20 + 70 + 80 &= 80 + 20 + 70 \\ &= 100 + 70 \\ &= 170 \end{aligned}$$

Start with the largest number.

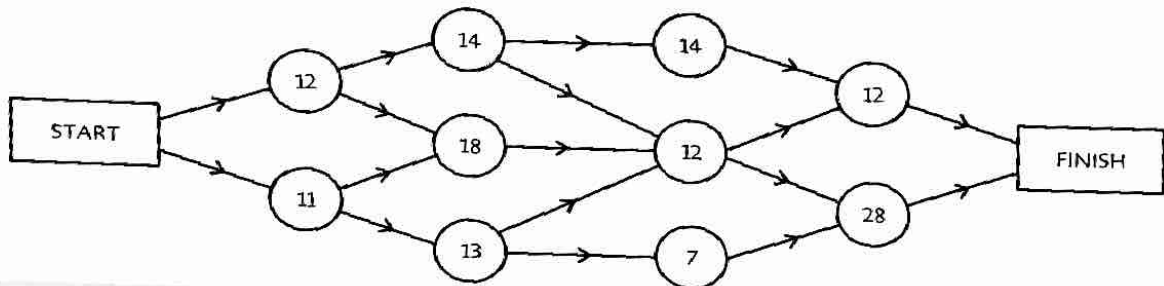
$$\begin{aligned} 6 + 13 + 28 + 5 &= 28 + 13 + 6 + 5 \\ &= 41 + 6 + 5 \\ &= 47 + 5 \\ &= 52 \end{aligned}$$

Recognise an equivalent multiplication.

$$\begin{aligned} 14 + 15 + 16 + 15 &= 4 \times 15 \\ &= 60 \end{aligned}$$

**A**

There are ten ways of going from the Start to the Finish.  
Find the total for each of the ten routes.

**B**

Work out

1  $26 + 18 + 14 + 7$

2  $21 + 23 + 24 + 22$

3  $30 + 50 + 60 + 50$

4  $52 + 50 + 53 + 57$

5  $90 + 70 + 20 + 40$

6  $28 + 27 + 16 + 22$

7  $15 + 19 + 25 + 17$

8  $7 + 6 + 18 + 5 + 9$

9  $5 + 14 + 9 + 6 + 3$

10  $38 + 24 + 32 + 13$

11  $15 + 9 + 24 + 7$

12  $9 + 5 + 13 + 7 + 8$

13  $39 + 38 + 39 + 40$

14  $40 + 30 + 50 + 70$

15  $50 + 190 + 30 + 80$

**C**

Copy and complete by writing the missing number in the box.

1  $76 + 18 + \square + 34 = 144$

2  $50 + 40 + \square + 60 + 20 = 260$

3  $40 + 39 + \square + 42 + 41 = 205$

4  $72 + \square + 39 + 48 = 187$

5  $140 + 270 + \square + 160 = 720$

6  $59 + \square + 43 + 61 = 199$

7  $6 + 18 + \square + 27 + 62 = 130$

8  $30 + 240 + 170 + \square = 510$

9  $24 + 25 + 28 + \square + 27 = 130$

10  $90 + 70 + 480 + \square + 40 = 740$

# MENTAL STRATEGIES (+ AND -)

On this page you will use and explain a variety of strategies to add or subtract pairs of numbers mentally.

## A

Copy and complete the squares.

1

+	260	380	450
390	650		
540			
460			

2

-	320	250	510
873	553		
685			
968			

3

+	2.6	1.9	5.7
2.5			
3.7			
5.8			

4

-	360	290	470
540			
820			
650			

5

+	700	500	800
693			
879			
521			

6

-	2.6	5.9	4.8
8.2	5.6		
7.5			
9.3			

## B

Write the answers only.

- 1  $6800 + 2500$
- 2  $5300 - 2700$
- 3  $0.5 + 0.28$
- 4  $0.72 - 0.4$
- 5  $0.65 + 0.3$
- 6  $0.9 - 0.32$
- 7  $3600 + 3500$
- 8  $3.2 - 0.05$
- 9  $0.04 + 0.2$
- 10  $0.6 - 0.17$
- 11  $3700 + 4800$
- 12  $9300 - 4700$
- 13  $0.4 + 0.31$
- 14  $0.84 - 0.6$
- 15  $0.53 + 0.4$
- 16  $8100 - 2900$

Add 5.9 to:

- 17 3.7
- 18 5.4
- 19 8.9

Add 3600 to:

- 20 2600
- 21 5900
- 22 4700

Take 3.1 from:

- 23 6.5
- 24 9.2
- 25 4.8

Take 2700 from:

- 26 7400
- 27 3600
- 28 9100

Make 1.

- 29 0.54
- 30 0.37
- 31 0.61

Make 10 000.

- 32 7300
- 33 5800
- 34 1400

## C

Copy and complete.

- 1  $\square + 4700 = 11500$
- 2  $\square - 6900 = 5400$
- 3  $0.524 - \square = 0.124$
- 4  $\square - 0.006 = 0.065$
- 5  $\square + 0.3 = 0.796$
- 6  $0.951 - \square = 0.948$
- 7  $2.681 + \square = 3$
- 8  $2.681 + \square = 2.7$
- 9  $2.681 + \square = 2.69$
- 10  $0.892 - \square = 0.592$
- 11  $\square - 0.877 = 1$
- 12  $\square - 0.344 = 0.4$
- 13  $\square - 0.253 = 0.26$
- 14  $0.68 - \square = 0.674$
- 15  $0.8 - \square = 0.725$
- 16  $\square + 3400 = 11100$
- 17  $\square - 4300 = 8800$
- 18  $7500 + \square = 13300$

Copy and complete the squares.

19

+	0.38	0.9	1.06
0.67			
1.5			
2.4			

20

-	0.5	0.38	0.76
1.0	0.5		
2.6			
0.82			

On this page you will learn two informal methods for addition.

### ADD LARGEST VALUE DIGITS FIRST

<b>Examples</b>	5384	2673
	+ 2729	+ 1592
	<u>7000</u>	<u>3000</u>
	1000	1100
	100	160
	13	5
	<u>8113</u>	<u>4265</u>

### COMPENSATION

<b>Example</b>	4865	
	+ 2678	
	<u>7865</u>	(4865 + 3000)
	- 322	(2678 - 3000)
	<u>7543</u>	

### A

Use both methods for each sum.

- |   |       |    |       |
|---|-------|----|-------|
| 1 | 583   | 6  | 364   |
|   | + 249 |    | + 186 |
| 2 | 659   | 7  | 786   |
|   | + 278 |    | + 275 |
| 3 | 871   | 8  | 947   |
|   | + 685 |    | + 593 |
| 4 | 1654  | 9  | 1368  |
|   | + 927 |    | + 467 |
| 5 | 2087  | 10 | 4923  |
|   | + 359 |    | + 958 |

- 11 267 women and 395 men belong to a Health Club. How many members are there altogether?



### B

Use both methods for each sum.

- |   |        |    |        |
|---|--------|----|--------|
| 1 | 4287   | 6  | 4392   |
|   | + 1946 |    | + 4678 |
| 2 | 3649   | 7  | 2685   |
|   | + 1578 |    | + 1594 |
| 3 | 4564   | 8  | 5417   |
|   | + 2788 |    | + 2863 |
| 4 | 6478   | 9  | 7254   |
|   | + 1957 |    | + 4135 |
| 5 | 5895   | 10 | 8769   |
|   | + 2578 |    | + 3946 |

- 11 In December a factory made 5962 cars. In January production increased by 1378. How many cars were made in January?

- 12 Aeysha's annual salary was £17348. She also earned a bonus of £1365. How much was she paid altogether?

### C

Add largest value digits first. Set out as in the examples.

- |   |               |
|---|---------------|
| 1 | 3486 + 1957   |
| 2 | 12385 + 7850  |
| 3 | 23408 + 15473 |
| 4 | 9748 + 2976   |
| 5 | 5839 + 7794   |
| 6 | 38674 + 9369  |

Use compensation. Set out as in the example.

- |    |               |
|----|---------------|
| 7  | 6907 + 5798   |
| 8  | 7564 + 3988   |
| 9  | 47561 + 24938 |
| 10 | 8675 + 4976   |
| 11 | 17923 + 5786  |
| 12 | 56790 + 7692  |

- 13 A car had a mileage of 32517. In the next year it was driven a further 9864 miles. What was the new mileage?

# STANDARD METHOD FOR ADDITION

On this page you will learn to use a standard method for addition.

**Examples**

$$\begin{array}{r} 643 \\ + 428 \\ \hline 1071 \\ \hline \end{array}$$

$$\begin{array}{r} 3248 \\ + 1572 \\ \hline 4820 \\ \hline \end{array}$$

$$\begin{array}{r} 7486 \\ + 3927 \\ \hline 11413 \\ \hline \end{array}$$

**A**

Copy and complete.

- |   |         |    |         |
|---|---------|----|---------|
| 1 | $485$   | 7  | $3682$  |
|   | $+ 348$ |    | $+ 469$ |
| 2 | $379$   | 8  | $1568$  |
|   | $+ 184$ |    | $+ 785$ |
| 3 | $696$   | 9  | $4574$  |
|   | $+ 275$ |    | $+ 972$ |
| 4 | $1257$  | 10 | $2871$  |
|   | $+ 596$ |    | $+ 854$ |
| 5 | $2808$  | 11 | $3695$  |
|   | $+ 639$ |    | $+ 637$ |
| 6 | $2937$  | 12 | $5284$  |
|   | $+ 448$ |    | $+ 919$ |

- 13 2758 cars used a car park on Sunday. This was 697 fewer cars than on the previous day. How many cars had used the car park on Saturday?



**B**

Copy and complete.

- |   |          |    |          |
|---|----------|----|----------|
| 1 | $4835$   | 7  | $9837$   |
|   | $+ 2689$ |    | $+ 1695$ |
| 2 | $5786$   | 8  | $6794$   |
|   | $+ 3698$ |    | $+ 5987$ |
| 3 | $7968$   | 9  | $7985$   |
|   | $+ 4287$ |    | $+ 4653$ |
| 4 | $6957$   | 10 | $9469$   |
|   | $+ 5728$ |    | $+ 5165$ |
| 5 | $3579$   | 11 | $8736$   |
|   | $+ 1859$ |    | $+ 3295$ |
| 6 | $8658$   | 12 | $7689$   |
|   | $+ 1879$ |    | $+ 5726$ |

- 13 Winston has £6584 in his bank account. A cheque for his monthly salary of £1947 is paid in. How much is there now in the account?
- 14 New York is 3473 miles from London. San Francisco is a further 1896 miles away. How far is it from London to San Francisco?

**C**

Set out as in the example.

- 1  $13756 + 8475$
- 2  $24673 + 6959$
- 3  $51968 + 8274$
- 4  $84789 + 7689$
- 5  $60597 + 5768$
- 6  $29627 + 4896$
- 7  $58384 + 3876$
- 8  $47493 + 5876$
- 9  $36569 + 9653$
- 10  $43758 + 8974$

- 11 The population of a town is 69776. A further 6478 people live in a nearby village. What is their combined population?
- 12 35827 watched City's home game. The attendance at their next match was 9195 more. How many people watched the second game?



On this page you will learn:

- to add several numbers.

### Example

Add 7, 638, 2614, 92, 3526

$$\begin{array}{r}
 7 \\
 638 \\
 2614 \\
 92 \\
 + 3526 \\
 \hline
 6877 \\
 \hline
 \end{array}$$

Line-up the units.

- to add decimals.

### Example

320 m + 5.7 km + 83 m

$$\begin{array}{r}
 \text{km} \\
 0.320 \\
 5.700 \\
 + 0.083 \\
 \hline
 6.103 \\
 \hline
 \end{array}$$

Line up the decimal points.  
Put in missing zeros.

## A

Copy and complete.

1

$$\begin{array}{r}
 26 \\
 488 \\
 3 \\
 1265 \\
 + \quad 97 \\
 \hline
 \end{array}$$

2

$$\begin{array}{r}
 329 \\
 59 \\
 3642 \\
 47 \\
 + \quad 8 \\
 \hline
 \end{array}$$

3

$$\begin{array}{r}
 2406 \\
 75 \\
 186 \\
 4 \\
 + \quad 83 \\
 \hline
 \end{array}$$

4

$$\begin{array}{r}
 \text{£} \\
 1.63 \\
 0.28 \\
 0.07 \\
 + 1.15 \\
 \hline
 \end{array}$$

5

$$\begin{array}{r}
 \text{£} \\
 4.38 \\
 1.92 \\
 0.06 \\
 + 2.54 \\
 \hline
 \end{array}$$

6

$$\begin{array}{r}
 \text{£} \\
 0.32 \\
 3.46 \\
 2.59 \\
 + 1.01 \\
 \hline
 \end{array}$$

## B

Set out as sums and find the totals.

1  $324 + 4452 + 56 + 8 + 1705$

2  $3663 + 3 + 971 + 2537 + 79$

3  $2192 + 586 + 3675 + 98 + 2$

4  $5 + 1738 + 27 + 243 + 2584$

5  $23.29 + 6.8$

6  $145.7 + 2.38$

7  $18.2 + 1.03 + 0.25$

8  $217.16 + 0.05 + 3.7$

9  $1.3 \text{ km} + 270 \text{ m}$

10  $4.86 \text{ km} + 1300 \text{ m}$

11  $400 \text{ m} + 60 \text{ m} + 2.7 \text{ km}$

12  $0.8 \text{ km} + 4.365 \text{ km} + 20 \text{ m}$

## C

Set out as sums and find the totals.

1  $182 + 3254 + 736 + 3 + 12387$

2  $6 + 30653 + 541 + 3475 + 928$

3  $2963 + 345 + 25712 + 294 + 7$

4  $57919 + 683 + 8 + 2537 + 651$

5  $6.1 + 0.087$

6  $13.04 + 7.603$

7  $1.92 + 148.3 + 0.165$

8  $17.36 + 1.128 + 0.9$

9  $12.1 \text{ km} + 263 \text{ m}$

10  $0.07 \text{ km} + 1832 \text{ m}$

11  $1.3 \text{ km} + 0.97 \text{ km} + 156 \text{ m}$

12  $0.006 \text{ km} + 19 \text{ m} + 7 \text{ m}$



# INFORMAL METHODS FOR SUBTRACTION

On this page you will learn two informal written methods for subtraction.

## COUNTING UP

$$\begin{array}{r} 5435 \\ -1767 \\ \hline 33 \quad (1800) \\ 200 \quad (2000) \\ \hline 3435 \quad (5435) \\ \hline 3668 \end{array}$$

## COMPENSATION

$$\begin{array}{r} 5345 \\ -1767 \\ \hline 3345 \quad (5345 - 2000) \\ + 233 \quad (2000 - 1767) \\ \hline 3578 \end{array}$$

### A

Use both methods for each sum.

①  $437 - 186$       ⑦  $361 - 289$

②  $293 - 175$       ⑧  $953 - 564$

③  $359 - 268$       ⑨  $237 - 178$

④  $565 - 437$       ⑩  $872 - 317$

⑤  $681 - 394$       ⑪  $540 - 181$

⑥  $724 - 255$       ⑫  $913 - 625$

- ⑬ Glen spent £625 on hats on Friday and £382 on Saturday. How much less did he spend on Saturday?



### B

Use both methods for each sum.

①  $2961 - 1397$       ⑦  $6315 - 3678$

②  $5146 - 3972$       ⑧  $5873 - 4132$

③  $8362 - 2784$       ⑨  $3140 - 2753$

④  $6314 - 2586$       ⑩  $7522 - 3947$

⑤  $9083 - 4430$       ⑪  $8305 - 5863$

⑥  $4160 - 2381$       ⑫  $9141 - 2703$

- ⑬ There are 1267 children in Southan. The population of the town is 8254. How many adults live in the town?

- ⑭ 8651 people saw a film in June. 2174 less people saw the film in July. What was the total audience for July?

### C

Set out correctly. Use both methods for each sum.

①  $16512 - 14675$

②  $13747 - 12968$

③  $27934 - 18157$

④  $32158 - 25389$

⑤  $50361 - 33596$

⑥  $24061 - 17596$

⑦  $37517 - 29831$

⑧  $46234 - 18359$

⑨  $48902 - 23145$

⑩  $31185 - 24637$

⑪  $42350 - 22576$

⑫  $60713 - 39816$

- ⑬ In her old job Amelia was paid £17 956 each year. Her new annual salary is £24 172. By how much has her salary increased?

- ⑭ 52 750 copies of a magazine were printed but only 38 519 were sold. How many copies were not sold?

On this page you will learn to use decomposition.

## METHOD 1

$$\begin{array}{r} 5428 \\ -2794 \\ \hline \end{array} = \begin{array}{r} 53\overset{1}{2}8 \\ -2794 \\ \hline \end{array} = \begin{array}{r} 4\overset{13}{2}8 \\ -2794 \\ \hline 2634 \end{array}$$

## METHOD 2

$$\begin{array}{r} \phantom{0}4\phantom{0}13\phantom{0}12 \\ 5428 \\ -2794 \\ \hline 2634 \end{array}$$

## A

Use Method 1.

$$\textcircled{1} \begin{array}{r} 374 \\ -168 \\ \hline \end{array} \quad \textcircled{4} \begin{array}{r} 737 \\ -293 \\ \hline \end{array}$$

$$\textcircled{2} \begin{array}{r} 485 \\ -237 \\ \hline \end{array} \quad \textcircled{5} \begin{array}{r} 529 \\ -438 \\ \hline \end{array}$$

$$\textcircled{3} \begin{array}{r} 609 \\ -345 \\ \hline \end{array} \quad \textcircled{6} \begin{array}{r} 850 \\ -471 \\ \hline \end{array}$$

Use Method 2.

$$\textcircled{7} \begin{array}{r} 638 \\ -276 \\ \hline \end{array} \quad \textcircled{10} \begin{array}{r} 426 \\ -218 \\ \hline \end{array}$$

$$\textcircled{8} \begin{array}{r} 394 \\ -167 \\ \hline \end{array} \quad \textcircled{11} \begin{array}{r} 923 \\ -456 \\ \hline \end{array}$$

$$\textcircled{9} \begin{array}{r} 251 \\ -139 \\ \hline \end{array} \quad \textcircled{12} \begin{array}{r} 841 \\ -537 \\ \hline \end{array}$$

- 13** Arthur worked for 325 minutes on Monday and only 183 minutes on Tuesday. How many more minutes did he work on Monday?



## B

Use Method 2.

$$\textcircled{1} \begin{array}{r} 4080 \\ -2163 \\ \hline \end{array} \quad \textcircled{7} \begin{array}{r} 5832 \\ -2563 \\ \hline \end{array}$$

$$\textcircled{2} \begin{array}{r} 2737 \\ -1943 \\ \hline \end{array} \quad \textcircled{8} \begin{array}{r} 3690 \\ -2318 \\ \hline \end{array}$$

$$\textcircled{3} \begin{array}{r} 5326 \\ -2851 \\ \hline \end{array} \quad \textcircled{9} \begin{array}{r} 9416 \\ -5738 \\ \hline \end{array}$$

$$\textcircled{4} \begin{array}{r} 7143 \\ -3456 \\ \hline \end{array} \quad \textcircled{10} \begin{array}{r} 8025 \\ -3279 \\ \hline \end{array}$$

$$\textcircled{5} \begin{array}{r} 3501 \\ -2937 \\ \hline \end{array} \quad \textcircled{11} \begin{array}{r} 6174 \\ -4586 \\ \hline \end{array}$$

$$\textcircled{6} \begin{array}{r} 8264 \\ -3895 \\ \hline \end{array} \quad \textcircled{12} \begin{array}{r} 7350 \\ -6974 \\ \hline \end{array}$$

- 13** Mustapha has £2640 in his bank account. He withdraws £1825. How much is left in the account?

- 14** In one week 1827 children used a swimming pool. The total number of tickets sold was 3163. How many adults used the pool?

## C

Set out correctly and use Method 2.

$$\textcircled{1} 43464 - 13709$$

$$\textcircled{2} 32032 - 16158$$

$$\textcircled{3} 20783 - 10795$$

$$\textcircled{4} 45327 - 26587$$

$$\textcircled{5} 51501 - 24653$$

$$\textcircled{6} 74260 - 47898$$

$$\textcircled{7} 34715 - 16379$$

$$\textcircled{8} 53263 - 24685$$

$$\textcircled{9} 71521 - 42763$$

$$\textcircled{10} 42170 - 39186$$

$$\textcircled{11} 25312 - 17615$$

$$\textcircled{12} 80637 - 53789$$

- 13** In December a shop had takings of £51309. In January takings fell by £23687. How much was taken in January?

- 14** At the beginning of the year the milometer on a car read 27495. At the end of the year it read 42360. How many miles had the car travelled during the year?

# FINDING DIFFERENCES

41

On this page you will learn:

- to find the difference between numbers with different numbers of digits.

## Example

Find the difference between 3268 and 29 475.

$$\begin{array}{r} 29475 \text{ Larger number on top} \\ - 3268 \text{ Line up the units.} \\ \hline \end{array}$$

- to find the difference between decimals.

## Example

Find the difference between 2.47 and 0.6.

$$\begin{array}{r} 2.47 \text{ Line up the decimal points.} \\ - 0.60 \text{ Put in missing zeros.} \\ \hline \end{array}$$

## A

Copy and complete.

$$\begin{array}{r} \textcircled{1} \quad 5136 \\ - \quad 93 \\ \hline \end{array} \quad \begin{array}{r} \textcircled{6} \quad 7320 \\ - \quad 264 \\ \hline \end{array}$$

$$\begin{array}{r} \textcircled{2} \quad 3462 \\ - \quad 247 \\ \hline \end{array} \quad \begin{array}{r} \textcircled{7} \quad 7.35 \\ - \quad 5.69 \\ \hline \end{array}$$

$$\begin{array}{r} \textcircled{3} \quad 1271 \\ - \quad 368 \\ \hline \end{array} \quad \begin{array}{r} \textcircled{8} \quad 4.20 \\ - \quad 1.37 \\ \hline \end{array}$$

$$\begin{array}{r} \textcircled{4} \quad 4053 \\ - \quad 527 \\ \hline \end{array} \quad \begin{array}{r} \textcircled{9} \quad 8.41 \\ - \quad 4.38 \\ \hline \end{array}$$

$$\begin{array}{r} \textcircled{5} \quad 6514 \\ - \quad 47 \\ \hline \end{array} \quad \begin{array}{r} \textcircled{10} \quad 43.1 \\ - \quad 16.5 \\ \hline \end{array}$$

- 11** A shop has 1352 pairs of shoes in stock.

639 pairs are sold.  
How many are left?

- 12** A plank is 3.25 metres long. 1.38 metres is sawn off. How long is the plank now?

## B

Set out correctly and find the differences.

**1** 12 632 and 1374

**2** 687 and 35 410

**3** 20 371 and 2193

**4** 1761 and 57 143

**5** 41 528 and 571

**6** 698 and 63 250

**7** 26.1 – 1.8

**8** 80.2 – 13.75

**9** 45.3 – 9.7

**10** 4.22 – 2.5

**11** 3.5 – 0.61

**12** 2.4 – 1.55

- 13** The 100 metres was won in 10.83 seconds. Justin's time was 11.4 seconds. What was the difference between Justin's time and the winner's time?



## C

Set out correctly and find the differences.

**1** 135 703 and 981

**2** 687 and 35 410

**3** 20 371 and 2193

**4** 1761 and 57 143

**5** 41 528 and 571

**6** 698 and 63 250

**7** 14.32 – 1.5

**8** 3.21 – 0.526

**9** 4.391 – 2.7

**10** 8.13 – 1.64

**11** 27.4 – 4.965

**12** 3.625 – 0.79

- 13** Iqbal has £17243 in his bank account. He withdraws £1864. How much is left in the account?

- 14** A lorry is carrying 2.3 tonnes of goods. 0.56 tonnes is unloaded. How much weight is the lorry carrying?

On this page you will learn to use the inverse relationship of multiplication and division.

**Example**

Knowing one  $\times$  or  $\div$  fact means that you know 3 related facts.

$$0.4 \times 6 = 2.4$$

$$2.4 \div 6 = 0.4$$

$$6 \times 0.4 = 2.4$$

$$2.4 \div 0.4 = 6$$

**A**

Copy and complete each table.

1

	$\times 6$
9	$\rightarrow 54$
0.1	$\rightarrow$
	$\rightarrow 2.4$
	$\rightarrow 3.6$
8	$\rightarrow$

2

	$\times 7$
8	$\rightarrow 56$
	$\rightarrow 42$
0.5	$\rightarrow$
	$\rightarrow 6.3$
0.3	$\rightarrow$

3

	$\times 8$
5	$\rightarrow 40$
0.6	$\rightarrow$
	$\rightarrow 7.2$
	$\rightarrow 56$
	$\rightarrow 3.2$

4

	$\times 9$
0.2	$\rightarrow 1.8$
	$\rightarrow 81$
	$\rightarrow 4.5$
	$\rightarrow 63$
0.6	$\rightarrow$

**B**

Copy and complete.

- $\square \times 0.25 = 4$
- $4 \times \square = 2.8$
- $\square \times 2.3 = 23$
- $7 \times \square = 0.07$
- $\square \times 0.5 = 10$
- $\square \times 1 = 3$
- $6 \times \square = 0$
- $\square \times 8 = 6.4$
- $4 \times \square = 0.36$
- $\square \times 0.3 = 2.1$
- $\square \times 100 = 90$
- $3 \times \square = 0.15$
- $\square \times 5 = 2.0$
- $0.9 \times \square = 0.9$
- $\square \times 6 = 0.48$

Write four different  $\times$  or  $\div$  statements for each set of numbers.

- 1.2, 0.4, 3
- 0.2, 7, 1.4
- 6.5, 5, 1.3
- 2, 1.6, 3.2
- 6, 4, 1.5
- 0.7, 2.5, 1.75
- 1.9, 3, 5.7
- 0.6, 8.4, 14
- 80, 400, 5

**C**

Copy and complete these multiplication squares.

1

$\times$			9	
			54	
	35			36
				15
		36		27
7	49			

2

$\times$				
	40			64
	35		42	
			12	14
		12		
		27		63

3

$\times$				
		49		
	30			40
				36
		21		24
	36		54	24

4

$\times$				
	3.5			4.0
		7.2	32	
				0.48
	63		36	
		0.27		

## MULTIPLICATION PROBLEMS

43

On this page you will learn to use the vocabulary of multiplication.

### A

Write a number sentence for each problem and then work out the answer.

- 1 Find 7 groups of 6.
- 2 What is 20 times greater than 9?
- 3 What is 9 multiplied by 7?
- 4 Find the product of 31 and 8.
- 5 Multiply 0.4 by 10.
- 6 What is 3 times 1.5?
- 7 There are 16 biscuits in a packet. There are 5 packets. How many biscuits are there?
- 8 A small box holds 80 tea bags. A larger box holds three times as many. How many tea bags are in the larger box?
- 9 A shelf holds 15 videos. How many videos can 15 shelves hold?
- 10 It takes Navid 7.4 seconds to walk 10 metres. How long will it take him to walk 100 metres?



### B

Write a number sentence for each problem and work out the answer.

- 1 Find the product of 5 and 19.
- 2 What is 0.08 times 10?
- 3 Multiply 75 by 8.
- 4 What is 5 groups of 0.6?
- 5 An ant takes 1.23 seconds to walk 1 cm. How long will it take the ant to walk 2 metres?
- 6 How many hours are there in a week?
- 7 There are 17 oak trees in a wood. There are eight times as many beech trees. How many beech trees are there in the wood?
- 8 300 people watch a film on Thursday. The audience on Friday is 1.6 times larger. How many people watch the film on Friday?



### C

- 1 Look at the numbers in the box.

0.2 2.5 0.8 0.25 1.4

- a) What is the largest number multiplied by the smallest number?
  - b) What number is 1000 times greater than the second largest number?
  - c) What is 13 lots of the middle number?
  - d) Multiply the total of the three smallest numbers by 8.
  - e) What is the square of the sum of the two largest numbers?
  - f) Ten different products can be made using pairs of the five numbers. Can you find them all?
- 2 A play was performed 16 times. The average audience was 275. How many people saw the play?
  - 3 Each stride Jessica takes is 0.8 metres long. She paces out 260 strides. How far has she walked?

On this page you will learn to use the inverse relationship of division to multiplication.

**Example**

Knowing one  $\times$  or  $\div$  fact means that you know 3 related facts.

$8 \div 5 = 1.6$

$8 \div 1.6 = 5$

$5 \times 1.6 = 8$

$1.6 \times 5 = 8$

**A**

Copy and complete the tables.

1

	$\div 6$
24	$\rightarrow 4$
48	$\rightarrow$
	$\rightarrow 10$
42	$\rightarrow$
	$\rightarrow 3$
54	$\rightarrow$

2

	$\div 25$
50	$\rightarrow 2$
100	$\rightarrow$
	$\rightarrow 10$
	$\rightarrow 7$
200	$\rightarrow$
125	$\rightarrow$

3

	$\div 9$
54	$\rightarrow 6$
27	$\rightarrow$
	$\rightarrow 8$
36	$\rightarrow$
	$\rightarrow 7$
	$\rightarrow 9$

4

	$\div 10$
270	$\rightarrow 27$
35	$\rightarrow$
	$\rightarrow 2.4$
	$\rightarrow 8$
630	$\rightarrow$
	$\rightarrow 11.7$

**B**

Copy and complete.

- $72 \div \square = 8$
- $\square \div 10 = 0.47$
- $6.3 \div \square = 0.7$
- $\square \div 100 = 2.3$
- $54 \div \square = 9$
- $0.9 \div \square = 0.9$
- $\square \div 1 = 100$
- $15 \div \square = 2.5$
- $\square \div 12 = 12$
- $240 \div \square = 40$
- $28 \div \square = 0.28$
- $\square \div 4 = 0.6$
- $19 \div \square = 1.9$
- $\square \div 6 = 0.8$
- $11 \div \square = 0.11$
- $240 \div \square = 12$
- $\square \div 2 = 0.75$
- $1 \div \square = 0.01$
- $\square \div 7 = 1.3$
- $400 \div \square = 50$

Write three related  $\times$  or  $\div$  statements.

- $4 \times 0.2 = 0.8$
- $3.9 \div 3 = 1.3$
- $800 \div 25 = 32$
- $16 \times 24 = 384$

**C**

Copy and complete the tables.

1

INPUT		OUTPUT
6.25	$\div 5$	
0.04	$\div 10$	
0.56	$\div 8$	
	$\div 1$	39
	$\div 100$	0.2
4.2		0.7
5		0.005
0.8		0.2

2

INPUT		OUTPUT
420	$\div 1000$	
6.5	$\div 5$	
	$\div 10$	0.86
	$\div 9$	0.04
	$\div 15$	4.0
0.8		0.008
7.1		7.1
0.54		0.09

3

INPUT		OUTPUT
58	$\div 1$	
2.7	$\div 100$	
	$\div 8$	0.08
	$\div 1000$	0.01
	$\div 15$	0.04
0.6		0.06
3		1.5
39		0.039

## DIVISION PROBLEMS

45

On this page you will learn to use the vocabulary of division.

### A

Write a number sentence for each problem and work out the answer.

- 1 Share 600 by 20.
- 2 What is one fifth of 90?
- 3 How many 8s are there in 72?
- 4 Divide 72 by 6.
- 5 What is 2100 divided by 7?
- 6 How many 15s go into 120?
- 7 Each box holds 6 cakes. How many boxes can be filled from 240 cakes?
- 8 £5.00 is shared between 4 friends. How much does each friend receive?
- 9 Luke's grandmother is 91. She is seven times as old as Luke. How old is Luke?
- 10 How many years are there in 84 months?
- 11 A council worker cut 90 cm of tape into 6 equal lengths. How long is each piece of tape?



### B

Write a number sentence for each problem and work out the answer.

- 1 A party of 22 people paid £396 for theatre tickets. How much did each ticket cost?



- 2 300 children are divided equally into 12 classes. How many children are there in each class?
- 3 Each glass has a capacity of 220 ml. How many glasses can be filled from 3 litres of fruit juice? How much fruit juice is left over?
- 4 7 metres of ribbon is cut into 25 equal lengths. How long is each length?
- 5 120 children were asked to choose their favourite day of the week. One third chose Saturday, one quarter chose Sunday and one eighth chose Friday. How many children chose a different day?

### C

Write a number sentence for each problem and work out the answer.

- 1 A lottery prize of £2100 is shared between 15 people. How much does each person win?
- 2 The 48 tins of sardines in a box weigh 16.8 kg. How much does each tin weigh?
- 3 Each bag holds 16 satsumas. How many bags can be filled from 592 satsumas?
- 4 In a random check, police found that 1 car in every 18 had dangerously worn tyres. 432 cars were inspected. How many cars had worn tyres?
- 5 In a game of Fantasy Cricket, England scored 252 runs. Openers Gooch and Compton scored one third and one quarter of the runs, while Botham smashed one seventh of the total. How many runs were scored by the rest of the side?



On this page you will practise the multiplication and division facts.

## A

Write the answers only.

- 1  $6 \times 2$       25  $6 \times 6$   
 2  $10 \times 2$     26  $10 \times 6$   
 3  $9 \times 2$       27  $8 \times 6$   
 4  $7 \times 2$       28  $4 \times 6$   
 5  $1 \times 2$       29  $9 \times 6$   
 6  $8 \times 2$       30  $7 \times 6$   
 7  $5 \times 3$       31  $9 \times 7$   
 8  $6 \times 3$       32  $6 \times 7$   
 9  $0 \times 3$       33  $1 \times 7$   
 10  $8 \times 3$      34  $8 \times 7$   
 11  $7 \times 3$      35  $7 \times 7$   
 12  $9 \times 3$      36  $5 \times 7$   
 13  $8 \times 4$      37  $0 \times 8$   
 14  $1 \times 4$      38  $7 \times 8$   
 15  $7 \times 4$      39  $9 \times 8$   
 16  $9 \times 4$      40  $3 \times 8$   
 17  $6 \times 4$      41  $6 \times 8$   
 18  $10 \times 4$     42  $8 \times 8$   
 19  $4 \times 5$      43  $8 \times 9$   
 20  $8 \times 5$      44  $5 \times 9$   
 21  $6 \times 5$      45  $7 \times 9$   
 22  $0 \times 5$      46  $9 \times 9$   
 23  $9 \times 5$      47  $4 \times 9$   
 24  $7 \times 5$      48  $6 \times 9$

49 Copy and complete the multiplication square.

$\times$			
6		24	
	63		72
	21	12	

## B

Copy and complete each of the tables.

1

$\times 6$
0.8 $\rightarrow$
0.4 $\rightarrow$
0.5 $\rightarrow$
0.7 $\rightarrow$
$\rightarrow 0$
$\rightarrow 0.6$
$\rightarrow 5.4$
$\rightarrow 3.6$

2

$\times 7$
0.3 $\rightarrow$
8 $\rightarrow$
5 $\rightarrow$
0.7 $\rightarrow$
$\rightarrow 7$
$\rightarrow 4.2$
$\rightarrow 6.3$
$\rightarrow 2.8$

3

$\times 8$
5 $\rightarrow$
0.9 $\rightarrow$
0.2 $\rightarrow$
8 $\rightarrow$
$\rightarrow 4.8$
$\rightarrow 8$
$\rightarrow 3.2$
$\rightarrow 56$

4

$\times 9$
4 $\rightarrow$
1 $\rightarrow$
0.6 $\rightarrow$
0.3 $\rightarrow$
$\rightarrow 81$
$\rightarrow 6.3$
$\rightarrow 0$
$\rightarrow 7.2$

## C

Write the answers only.

- 1  $0.8 \times 4$       11  $0.6 \times 0.9$   
 2  $7 \times 0.6$       12  $0.9 \times 0.8$   
 3  $0.5 \times 0.9$     13  $7 \times 0.03$   
 4  $0.6 \times 0.8$     14  $0.04 \times 8$   
 5  $0.06 \times 6$      15  $0.8 \times 7$   
 6  $0.6 \times 9$       16  $0.8 \times 0.8$   
 7  $3 \times 0.8$       17  $9 \times 0.4$   
 8  $8 \times 0.6$       18  $0.9 \times 7$   
 9  $0.7 \times 0.7$     19  $0.07 \times 6$   
 10  $8 \times 0.05$     20  $0.9 \times 0.9$

Copy and complete.

- 21  $\square \times 7 = 0.63$   
 22  $0.6 \times \square = 0.18$   
 23  $\square \div 9 = 0.8$   
 24  $0.18 \div \square = 0.06$   
 25  $\square \times 8 = 4.8$   
 26  $0.08 \times \square = 0.56$   
 27  $\square \div 5 = 9$   
 28  $6.3 \div \square = 0.7$   
 29  $\square \times 4 = 28$   
 30  $6 \times \square = 3.6$   
 31  $\square \div 8 = 0.08$   
 32  $2.8 \div \square = 0.4$   
 33  $\square \times 9 = 0.81$   
 34  $0.6 \times \square = 0.42$   
 35  $\square \div 6 = 0.9$   
 36  $0.56 \div \square = 0.08$



# REMAINDERS

On this page you will learn to give a remainder as a fraction or as a decimal fraction.

## Examples

$$94 \div 4 = 23 \frac{2}{4} = 23.5$$

$$\begin{array}{r} 23.5 \\ 4 \overline{)94.0} \\ \underline{8} \phantom{0} \\ 14 \phantom{0} \\ \underline{12} \phantom{0} \\ 2.0 \\ \underline{2.0} \phantom{0} \\ 0 \phantom{0} \end{array} \quad \begin{array}{l} (2 \times 4) \\ (3 \times 4) \\ (0.5 \times 4) \end{array}$$

$$18 \div 7 = 2 \frac{4}{7} = 2.6 \text{ (to 1 decimal place)}$$

$$\begin{array}{r} 2.57 \text{ etc.} \\ 7 \overline{)18.00} \\ \underline{14} \phantom{00} \\ 4.0 \phantom{0} \\ \underline{3.5} \phantom{0} \\ 0.50 \\ \underline{0.49} \\ 0.01 \text{ etc.} \end{array} \quad \begin{array}{l} (2 \times 7) \\ (0.5 \times 7) \\ (0.7 \times 7) \end{array}$$

## A

Give the answer as a fraction.

- 1  $91 \div 4$       6  $68 \div 5$   
 2  $169 \div 10$     7  $35 \div 6$   
 3  $35 \div 8$       8  $579 \div 100$   
 4  $307 \div 25$     9  $60 \div 7$   
 5  $56 \div 9$       10  $23 \div 8$

Give the answer as a decimal.

- 11  $147 \div 2$     16  $\text{£}5.70 \div 2$   
 12  $61 \div 4$      17  $\text{£}13.20 \div 4$   
 13  $83 \div 5$      18  $\text{£}43.20 \div 5$   
 14  $497 \div 10$    19  $\text{£}29.00 \div 10$   
 15  $71 \div 4$       20  $\text{£}11.40 \div 4$

21 Five friends travel by coach. Their tickets cost £78 altogether. How much does one ticket cost?

22 A car holds 50 litres of petrol. How many litres are left when the petrol tank is one quarter full?

## B

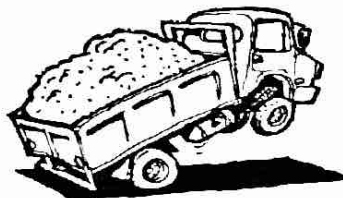
Give the answer as a fraction.

- 1  $107 \div 7$       6  $173 \div 8$   
 2  $103 \div 8$       7  $2617 \div 100$   
 3  $131 \div 9$       8  $131 \div 6$   
 4  $183 \div 11$      9  $238 \div 9$   
 5  $73 \div 6$        10  $180 \div 7$

Give the answer as a decimal. Round to one decimal place where appropriate.

- 11  $177 \div 10$     16  $132 \div 8$   
 12  $72 \div 5$       17  $93 \div 7$   
 13  $58 \div 4$       18  $107 \div 6$   
 14  $122 \div 9$      19  $181 \div 8$   
 15  $80 \div 3$       20  $238 \div 9$

21 8 loads weigh 1730 kg. What does one load weigh in kilograms?



## C

Copy and complete.

- 1  $\square \div 6 = 18 \frac{5}{6}$   
 2  $\square \div 9 = 26 \frac{4}{9}$   
 3  $\square \div 15 = 12 \frac{7}{15}$   
 4  $\square \div 8 = 21 \frac{7}{8}$   
 5  $\square \div 13 = 13 \frac{5}{13}$   
 6  $\square \div 7 = 33 \frac{5}{7}$   
 7  $\square \div 8 = 27 \frac{5}{8}$   
 8  $\square \div 7 = 48 \frac{3}{7}$   
 9  $\square \div 12 = 16 \frac{7}{12}$   
 10  $\square \div 9 = 43 \frac{2}{9}$

Give the answer as a decimal fraction. Where appropriate, round to one decimal place.

- 11  $73 \div 20$   
 12  $2432 \div 1000$   
 13  $11 \div 8$   
 14  $173 \div 7$   
 15  $150 \div 9$   
 16  $92 \div 25$   
 17  $386 \div 8$   
 18  $294 \div 12$

On this page you will learn to make sensible decisions about rounding up or down after division.

## Examples

- How many £12 tickets can I buy with £187?

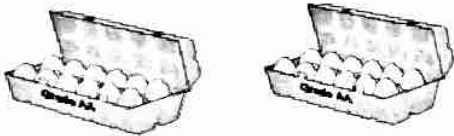
$$187 \div 12 = 15 \text{ remainder } 7$$

Answer: 15 tickets can be bought.

- An egg box holds 12 eggs. How many boxes are needed for 187 eggs?

$$187 \div 12 = 15 \text{ remainder } 7$$

Answer: 16 boxes are needed.



- Each jar holds 400 g of jam. How many jars can be filled from 5 kilograms of jam?

$$5000 \div 400 = 12 \text{ remainder } 200$$

Answer: 12 jars can be filled.

- Maurice earns £400 each week. How many weeks will it take him to earn £5000?

$$5000 \div 400 = 12 \text{ remainder } 200$$

Answer: It takes 13 weeks.



## A

- How many 7-a-side rugby teams can be formed from 95 players?
- A shop can display 12 dresses on a rail. How many rails are needed to display 80 dresses?
- 8 shuttlecocks are packed in a tube. How many tubes can be filled from 125 shuttlecocks?



- 6 people can sit at each table in a factory canteen. How many tables are needed to seat the 200 workers at the factory?
- A cup of coffee costs 90p. How many can be bought with £14?
- Tom wants to buy a Hi Fi costing £150. He saves £9 each week. How many weeks will it take him to save the money he needs?
- Safety pins are sold in boxes of 25. How many boxes can be filled from 84 safety pins?
- A mini bus can carry 15 passengers. How many mini buses are needed to carry 98 people?
- How many complete weeks are there in 160 days?
- Atlases are packed in boxes of 20. How many boxes will be needed for 250 atlases ordered by a school?

**B**

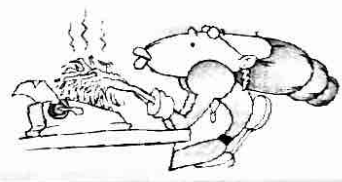
- 1 A river ferry can take 48 cars on each trip. How many crossings does the ferry need to make to carry 600 cars?



- 2 Felt tips are sold in packets of 12. How many packets can be made up from 152 felt tips?
- 3 Cans of drink cost 65p. How many cans can be bought with £10?
- 4 A school hall can fit 28 chairs into one row. How many rows are needed to seat 460 parents?
- 5 There are 25 milk cartons in each pack. A school needs 460 cartons. How many packs does it need to order?
- 6 A Rugby Union team has 15 players. How many teams can be made from 131 players?
- 7 A family saves £120 every month towards their £1000 holiday. How many months will it take to save the £1000?
- 8 How many 60 cm lengths of string can be cut from 65 metres?
- 9 Each egg box holds 6 eggs. How many boxes are needed for 350 eggs?
- 10 There are 16 sausages in each pack. How many packs can be made up from 500 sausages?

**C**

- 1 Each box contains 75 pills. How many boxes can be filled from 5000 pills?
- 2 One coach of a train can carry 72 passengers. How many coaches are needed to carry 1200 passengers?
- 3 There are 13 players in a Rugby League team. How many teams could you form from 205 players?
- 4 How many 350 g jars are needed to store 5 kg of marmalade?
- 5 A restaurant has 400 empty bottles. A crate holds 24 bottles. How many crates can be filled with empty bottles?
- 6 Amy walks to school every morning in order to save the 65p bus fare. How often does she need to do this before she has saved up the £30 she needs to buy a new pair of trainers?
- 7 A hot dog costs £1.20. How many hot dogs can be bought with £25?
- 8 Each coach can carry 53 passengers. How many coaches are needed to carry 3000 football supporters to an away match?
- 9 There are 960 staples in each box. How many boxes can be filled from one million staples?
- 10 An author writes 1800 words every day. How many days does it take her to write one million words?



# MENTAL STRATEGIES (× AND ÷)

On this page you will learn to use factors to multiply or divide.

**Examples**  $28 \times 18 = 28 \times 6 \times 3 = 168 \times 3 = 504$   
 $576 \div 18 = (576 \div 3) \div 6 = 192 \div 6 = 32$

**A**

Copy and complete.

- 1  $14 \times 6 = 14 \times 3 \times 2 =$
- 2  $15 \times 8 = 15 \times 2 \times 2 \times 2 =$
- 3  $9 \times 12 = 9 \times 3 \times 2 \times 2 =$
- 4  $7 \times 15 = 7 \times 3 \times 5 =$
- 5  $14 \times 9 = 14 \times 3 \times 3 =$
- 6  $96 \div 12 = 96 \div 3 \div 2 \div 2 =$
- 7  $126 \div 9 = 126 \div 3 \div 3 =$
- 8  $156 \div 12 = 156 \div 3 \div 2 \div 2 =$
- 9  $180 \div 15 = 180 \div 3 \div 5 =$
- 10  $210 \div 14 = 210 \div 7 \div 2 =$

**B**

Use factors to work out:

- 1  $45 \times 18$
- 2  $17 \times 27$
- 3  $24 \times 15$
- 4  $320 \div 16$
- 5  $336 \div 24$
- 6  $273 \div 21$
- 7  $19 \times 14$
- 8  $35 \times 24$
- 9  $21 \times 16$
- 10  $324 \div 18$

**C**

Use factors to work out:

- |                   |                    |
|-------------------|--------------------|
| 1 $12 \times 3.6$ | 11 $40.8 \div 24$  |
| 2 $16 \times 4.5$ | 12 $5.85 \div 45$  |
| 3 $1.3 \times 56$ | 13 $2.3 \times 27$ |
| 4 $32 \times 1.5$ | 14 $14 \times 1.8$ |
| 5 $1.7 \times 48$ | 15 $2.4 \times 35$ |
| 6 $18 \times 5.5$ | 16 $26 \times 2.8$ |
| 7 $36.8 \div 16$  | 17 $80 \div 25$    |
| 8 $48.3 \div 21$  | 18 $896 \div 32$   |
| 9 $3.96 \div 18$  | 19 $41.6 \div 52$  |
| 10 $33 \div 15$   | 20 $4.86 \div 27$  |

Now you will learn to work out a times-table by adding.

**Example**

EIGHTS	8	16	24	32	40	48	56	64	72	80
TENS	10	20	30	40	50	60	70	80	90	100
EIGHTEENS	18	36	54	72	90	108	126	144	162	180

**A**

Copy and complete the table to work out the 15 times-table.

FIVES	TENS	FIFTEENS
5	10	15
10	20	30
15	30	
20	.	
25	.	
.	.	
.	.	
.	.	
50	100	

**B**

Copy and continue the tables to  $\times 10$ .

SEVENS	TENS	SEVENTEENS
7	10	17
14	20	34

3s	20s	23s
3	20	23
6	40	46

**C**

Copy and continue the tables to  $\times 10$ .

6s	30s	36s
6	30	36
12	60	72

8s	40s	48s
8	40	48
16	80	96

# MENTAL STRATEGIES (× AND ÷)

On this page you will learn to multiply a number by 49, 51, 99 or 101.

**Examples**  $17 \times 51 = (17 \times 50) + (17 \times 1)$   
 $= 850 + 17$   
 $= 867$

$$17 \times 99 = (17 \times 100) - (17 \times 1)$$
$$= 1700 - 17$$
$$= 1683$$

## A

Work out

- 1  $9 \times 19$
- 2  $11 \times 19$
- 3  $13 \times 19$
- 4  $8 \times 21$
- 5  $21 \times 21$
- 6  $14 \times 21$
- 7  $18 \times 19$
- 8  $12 \times 19$
- 9  $24 \times 19$
- 10  $17 \times 21$

## B

Work out

- |                   |                    |
|-------------------|--------------------|
| 1 $13 \times 51$  | 11 $16 \times 99$  |
| 2 $16 \times 51$  | 12 $19 \times 99$  |
| 3 $18 \times 51$  | 13 $17 \times 51$  |
| 4 $12 \times 49$  | 14 $23 \times 51$  |
| 5 $15 \times 49$  | 15 $24 \times 49$  |
| 6 $19 \times 49$  | 16 $18 \times 49$  |
| 7 $11 \times 101$ | 17 $19 \times 101$ |
| 8 $15 \times 101$ | 18 $26 \times 101$ |
| 9 $17 \times 101$ | 19 $18 \times 99$  |
| 10 $14 \times 99$ | 20 $22 \times 99$  |

## C

Copy and complete.

- 1  $\square \div 41 = 12$
- 2  $\square \div 39 = 13$
- 3  $\square \div 61 = 11$
- 4  $\square \div 59 = 12$
- 5  $\square \div 41 = 15$
- 6  $\square \div 39 = 16$
- 7  $\square \div 61 = 16$
- 8  $\square \div 59 = 14$
- 9  $\square \div 41 = 17$
- 10  $\square \div 39 = 19$

Now you will learn to multiply by partitioning.

**Examples**  $79 \times 8 = (70 \times 8) + (9 \times 8)$   
 $= 560 + 72$   
 $= 632$

$$5.3 \times 6 = (5 \times 6) + (0.3 \times 6)$$
$$= 30 + 1.8$$
$$= 31.8$$

## A

Work out

- 1  $36 \times 4$
- 2  $49 \times 5$
- 3  $38 \times 6$
- 4  $27 \times 7$
- 5  $44 \times 8$
- 6  $26 \times 9$
- 7  $43 \times 4$
- 8  $56 \times 5$
- 9  $62 \times 6$
- 10  $32 \times 7$

## B

Work out

- |                   |                   |
|-------------------|-------------------|
| 1 $72 \times 6$   | 11 $6.7 \times 6$ |
| 2 $86 \times 7$   | 12 $7.6 \times 9$ |
| 3 $59 \times 8$   | 13 $83 \times 6$  |
| 4 $86 \times 9$   | 14 $6.9 \times 7$ |
| 5 $73 \times 7$   | 15 $75 \times 8$  |
| 6 $84 \times 8$   | 16 $9.4 \times 9$ |
| 7 $7.5 \times 6$  | 17 $96 \times 6$  |
| 8 $5.8 \times 7$  | 18 $9.7 \times 7$ |
| 9 $9.2 \times 8$  | 19 $68 \times 8$  |
| 10 $8.9 \times 9$ | 20 $5.7 \times 9$ |

## C

Copy and complete.

- 1  $\square \div 6 = 5.7$
- 2  $\square \div 7 = 8.3$
- 3  $\square \div 8 = 9.7$
- 4  $\square \div 9 = 6.9$
- 5  $\square \div 6 = 0.46$
- 6  $\square \div 7 = 7.8$
- 7  $\square \div 8 = 0.79$
- 8  $\square \div 9 = 8.7$
- 9  $\square \div 6 = 0.95$
- 10  $\square \div 7 = 0.67$

On this page you will practise multiplying a whole number or decimal fraction by any single-digit number.

Examples

$$64 \times 7 = (60 \times 7) + (4 \times 7)$$

$$= 420 + 28$$

$$= 448$$

$$0.8 \times 3 = 2.4$$

$$1.6 \times 4 = (1.0 \times 4) + (0.6 \times 4)$$

$$= 4 + 2.4$$

$$= 6.4$$

## A

Write the answers only.

- 1  $16 \times 2$
- 2  $18 \times 3$
- 3  $26 \times 2$
- 4  $24 \times 3$
- 5  $27 \times 4$
- 6  $42 \times 5$
- 7  $23 \times 6$
- 8  $38 \times 4$
- 9  $14 \times 7$
- 10  $24 \times 8$
- 11  $38 \times 5$
- 12  $26 \times 9$
- 13  $0.3 \times 2$
- 14  $0.4 \times 3$
- 15  $0.5 \times 7$
- 16  $0.6 \times 5$
- 17  $0.4 \times 6$
- 18  $0.5 \times 9$
- 19  $0.8 \times 5$
- 20  $0.3 \times 8$
- 21  $0.7 \times 4$
- 22  $0.3 \times 9$
- 23  $0.5 \times 6$
- 24  $0.2 \times 7$

## B

Copy and complete.

- 1  $58 \times 3 = \square$
- 2  $67 \times 4 = \square$
- 3  $0.4 \times 6 = \square$
- 4  $0.7 \times 8 = \square$
- 5  $3.6 \times 2 = \square$
- 6  $4.9 \times 5 = \square$
- 7  $5.3 \times 9 = \square$
- 8  $2.4 \times 7 = \square$
- 9  $64 \times \square = 128$
- 10  $0.7 \times \square = 3.5$
- 11  $4.7 \times \square = 14.1$
- 12  $2.4 \times \square = 19.2$
- 13  $39 \times \square = 156$
- 14  $0.9 \times \square = 6.3$
- 15  $2.3 \times \square = 13.8$
- 16  $3.5 \times \square = 28$
- 17  $\square \times 3 = 126$
- 18  $\square \times 5 = 230$
- 19  $\square \times 2 = 13.4$
- 20  $\square \times 4 = 3.2$
- 21  $\square \times 8 = 120$
- 22  $\square \times 7 = 14.7$
- 23  $\square \times 9 = 11.7$
- 24  $\square \times 6 = 5.4$

## C

Copy and complete the tables.

×6	
63	→ 378
4.9	→
	→ 4.8
	→ 10.2
	→ 17.4
	→ 27.6

×7	
59	→
6.4	→
	→ 17.5
	→ 13.3
	→ 29.4
	→ 23.8

×8	
47	→
7.6	→
	→ 13.6
	→ 23.2
	→ 42.4
	→ 36.8

×9	
83	→
5.7	→
	→ 12.6
	→ 32.4
	→ 36.9
	→ 20.7

# MENTAL STRATEGIES (× AND ÷)

On this page you will practise:

- multiplying a decimal fraction by 10 or 100.

**Examples**  $4.58 \times 10 = 45.8$   $6.9 \times 100 = 690$   
 $3.2 \times 10 = 32$   $0.47 \times 100 = 47$

- dividing a one or two-digit number by 10 or 100.

**Examples**  $65 \div 10 = 6.5$   $4 \div 100 = 0.04$   
 $7 \div 10 = 0.7$   $23 \div 100 = 0.23$

## A

Multiply by 10.

- 1 3.4      5 12.3  
 2 1.36     6 0.5  
 3 0.03     7 2.08  
 4 4.8      8 7.3

Divide by 10.

- 9 2          13 5  
 10 12       14 48  
 11 6        15 34  
 12 25       16 9

Multiply by 100.

- 17 1.25     21 8.2  
 18 4.07     22 0.63  
 19 0.5      23 0.09  
 20 3.62     24 5.14

Divide by 100.

- 25 31        29 43  
 26 75       30 18  
 27 63       31 57  
 28 26       32 9

## B

Work out

- 1  $2.4 \times 10$       9  $16 \div 10$   
 2  $1.37 \times 100$    10  $6 \div 100$   
 3  $17.4 \times 10$      11  $8 \div 10$   
 4  $8.2 \times 100$      12  $39 \div 10$   
 5  $1.36 \times 10$      13  $25 \div 100$   
 6  $0.5 \times 10$       14  $1 \div 100$   
 7  $4.07 \times 100$    15  $34 \div 100$   
 8  $0.63 \times 100$    16  $86 \div 100$

Copy and complete.

- 17  $\square \times 10 = 0.3$   
 18  $52 \div \square = 5.2$   
 19  $0.5 \times \square = 50$   
 20  $\square \div 100 = 0.03$   
 21  $\square \div 10 = 0.7$   
 22  $\square \times 100 = 9$   
 23  $2.08 \times \square = 20.8$   
 24  $59 \div \square = 0.59$   
 25 Ladybirds weigh 0.071 grams.  
 How much do 100 ladybirds weigh?



## C

Copy and complete the tables.

1

÷10
3 → 0.3
→ 1.7
→ 0.9
26 →

2

×100
4.71 → 471
13.9 →
→ 0.6
0.15 →

3

÷100
18 → 0.18
2 →
→ 0.05
36 →

4

×1000
→ 400
5.63 →
→ 2600
→ 8

5

÷1000
24 →
→ 0.006
→ 0.03
7 →

On this page you will practise:

- doubling a decimal fraction.

**Examples**  $0.67 \times 2 = (0.6 \times 2) + (0.07 \times 2)$   
 $= 1.2 + 0.14$   
 $= 1.34$

$$0.29 \times 2 = (0.2 \times 2) + (0.09 \times 2)$$

$$= 0.4 + 0.18$$

$$= 0.58$$

- halving a decimal fraction.

**Examples**  $0.27 \div 2 = (0.2 \div 2) + (0.07 \div 2)$   
 $= 0.1 + 0.035$   
 $= 0.135$

$$0.56 \div 2 = (0.5 \div 2) + (0.06 \div 2)$$

$$= 0.25 + 0.03$$

$$= 0.28$$

### A

Double these numbers.

- |        |         |
|--------|---------|
| 1 0.4  | 9 0.24  |
| 2 0.7  | 10 0.35 |
| 3 0.5  | 11 0.64 |
| 4 0.2  | 12 0.81 |
| 5 0.9  | 13 0.8  |
| 6 0.6  | 14 0.43 |
| 7 0.82 | 15 0.75 |
| 8 0.31 | 16 0.92 |

Halve these numbers.

- |         |         |
|---------|---------|
| 17 0.6  | 25 1.2  |
| 18 0.44 | 26 0.92 |
| 19 0.8  | 27 1.8  |
| 20 0.36 | 28 1.0  |
| 21 0.52 | 29 0.82 |
| 22 0.68 | 30 1.6  |
| 23 1.4  | 31 2.4  |
| 24 0.84 | 32 0.74 |

### B

Write the answers only.

- |                   |                  |
|-------------------|------------------|
| 1 $0.3 \times 2$  | 7 $0.7 \div 2$   |
| 2 $0.8 \times 2$  | 8 $0.26 \div 2$  |
| 3 $0.09 \times 2$ | 9 $0.38 \div 2$  |
| 4 $0.26 \times 2$ | 10 $0.08 \div 2$ |
| 5 $0.72 \times 2$ | 11 $0.9 \div 2$  |
| 6 $0.65 \times 2$ | 12 $0.45 \div 2$ |

Copy and complete.

- 13  $\square \times 2 = 0.76$   
 14  $\square \div 2 = 0.25$   
 15  $\square \times 2 = 1.7$   
 16  $\square \div 2 = 0.77$   
 17  $\square \times 2 = 1.4$   
 18  $\square \div 2 = 0.9$   
 19  $\square \times 2 = 0.34$   
 20  $\square \div 2 = 0.65$   
 21  $\square \times 2 = 0.98$   
 22  $\square \div 2 = 0.59$   
 23  $\square \times 2 = 1.32$   
 24  $\square \div 2 = 0.96$

### C

Copy and complete the tables.

1

Double	
0.29	→ 0.58
0.35	→
0.315	→
0.69	→
0.825	→
0.665	→
	→ 1.9
	→ 1.45
	→ 0.35
	→ 1.75
	→ 0.67

2

Halve	
0.35	→ 0.175
0.86	→
0.3	→
0.73	→
0.98	→
0.57	→
	→ 0.125
	→ 0.775
	→ 0.895
	→ 0.545
	→ 0.235



# DOUBLING AND HALVING

On this page you will practise doubling and halving and learn to use partitioning to double and halve.

## Examples

$$\text{Double } 58 = (50 \times 2) + (8 \times 2) = 100 + 16 = 116$$

$$\text{Double } 0.76 = (0.7 \times 2) + (0.06 \times 2) = 1.4 + 0.12 = 1.52$$

$$\text{Half of } 358 = (300 \div 2) + (50 \div 2) + (8 \div 2) = 150 + 25 + 4 = 179$$

$$\text{Half of } 13.5 = (13 \div 2) + (0.5 \div 2) = 6.5 + 0.25 = 6.75$$

## A

Double each number.

- |      |         |
|------|---------|
| 1 36 | 6 66    |
| 2 44 | 7 58    |
| 3 54 | 8 260   |
| 4 85 | 9 470   |
| 5 47 | 10 7500 |

Halve each number.

- |        |           |
|--------|-----------|
| 11 92  | 16 148    |
| 12 154 | 17 740    |
| 13 66  | 18 1380   |
| 14 116 | 19 12 600 |
| 15 172 | 20 14 800 |

Double by partitioning.

- |        |        |
|--------|--------|
| 21 164 | 25 159 |
| 22 118 | 26 187 |
| 23 176 | 27 173 |
| 24 195 | 28 166 |

Halve by partitioning.

- |        |        |
|--------|--------|
| 29 362 | 33 336 |
| 30 274 | 34 318 |
| 31 358 | 35 394 |
| 32 282 | 36 376 |

## B

Write the answer only.

- |                    |                   |
|--------------------|-------------------|
| 1 $640 \times 2$   | 13 $920 \div 2$   |
| 2 $580 \times 2$   | 14 $194 \div 2$   |
| 3 $870 \times 2$   | 15 $1360 \div 2$  |
| 4 $7300 \times 2$  | 16 $16400 \div 2$ |
| 5 $4900 \times 2$  | 17 $15600 \div 2$ |
| 6 $7600 \times 2$  | 18 $17800 \div 2$ |
| 7 $8.2 \times 2$   | 19 $12.8 \div 2$  |
| 8 $5.6 \times 2$   | 20 $18.1 \div 2$  |
| 9 $8.9 \times 2$   | 21 $15.7 \div 2$  |
| 10 $0.95 \times 2$ | 22 $1.46 \div 2$  |
| 11 $0.67 \times 2$ | 23 $1.23 \div 2$  |
| 12 $0.98 \times 2$ | 24 $17.9 \div 2$  |

Work out by partitioning.

- |                   |                  |
|-------------------|------------------|
| 25 $274 \times 2$ | 34 $4.72 \div 2$ |
| 26 $396 \times 2$ | 35 $2.56 \div 2$ |
| 27 $277 \times 2$ | 36 $3.38 \div 2$ |
| 28 $483 \times 2$ | 37 $36.4 \div 2$ |
| 29 $238 \times 2$ | 38 $2.78 \div 2$ |
| 30 $369 \times 2$ | 39 $5.16 \div 2$ |
| 31 $445 \times 2$ | 40 $43.2 \div 2$ |
| 32 $257 \times 2$ | 41 $3.68 \div 2$ |
| 33 $379 \times 2$ | 42 $6.94 \div 2$ |

## C

Copy and complete.

- |                                |
|--------------------------------|
| 1 $\square \times 2 = 15\ 800$ |
| 2 $\square \times 2 = 18\ 300$ |
| 3 $\square \times 2 = 13\ 700$ |
| 4 $\square \times 2 = 17\ 400$ |
| 5 $\square \div 2 = 182$       |
| 6 $\square \div 2 = 168$       |
| 7 $\square \div 2 = 256$       |
| 8 $\square \div 2 = 1850$      |
| 9 $\square \times 2 = 17.4$    |
| 10 $\square \times 2 = 13.9$   |
| 11 $\square \times 2 = 17.5$   |
| 12 $\square \times 2 = 18.1$   |
| 13 $\square \div 2 = 1270$     |
| 14 $\square \div 2 = 2490$     |
| 15 $\square \div 2 = 24.3$     |
| 16 $\square \div 2 = 17.6$     |
| 17 $\square \times 2 = 1.17$   |
| 18 $\square \times 2 = 1.38$   |
| 19 $\square \times 2 = 1.59$   |
| 20 $\square \times 2 = 1.23$   |
| 21 $\square \div 2 = 23.7$     |
| 22 $\square \div 2 = 1.94$     |
| 23 $\square \div 2 = 1.88$     |
| 24 $\square \div 2 = 1.79$     |

On this page you will learn to use doubling or halving to solve calculations.

### Examples

#### • MULTIPLICATION

a) Find  $13 \times 14$       $13 \times 14 = 13 \times 7 \times 2$   
 $= 91 \times 2$   
 $= 182$

b) Find  $14 \times 15$       $14 \times 10 = 140$   
 $140 \div 2 = 70$   
 $14 \times 15 = 210$

c) Find  $46 \times 25$       $46 \times 25 = 23 \times 50$   
 $= 11.5 \times 100$   
 $= 1150$

#### • FRACTIONS

Find  $\frac{1}{12}$  of 90      $\frac{1}{3}$  of 90 = 30  
 $\frac{1}{6}$  of 90 = 15  
 $\frac{1}{12}$  of 90 = 7.5

#### • MULTIPLES

Some multiples of 22 can be worked out by doubling.

$$1 \times 22 = 22$$

$$2 \times 22 = 44$$

$$4 \times 22 = 88$$

$$8 \times 22 = 176$$

$$16 \times 22 = 352$$

These multiples can be used to solve calculations.

$$23 \times 22 = (16 \times 22) + (8 \times 22) - (1 \times 22)$$

$$= 352 + 176 - 22$$

$$= 352 + 154$$

$$= 506$$

$$13 \times 22 = (8 \times 22) + (4 \times 22) + (1 \times 22)$$

$$= 176 + 88 + 22$$

$$= 176 + 110$$

$$= 286$$

### A

- 1 Make the 16 times-table by doubling the 8 times-table.

8 times-table	16 times-table
8	16
16	
24	
32	
40	80
48	
56	
64	
72	
80	

Work out by doubling or halving.  
Show the method used.

- 2  $13 \times 50$                       8  $8 \times 15$   
 3  $16 \times 50$                       9  $12 \times 15$   
 4  $18 \times 50$                       10  $15 \times 15$   
 5  $23 \times 50$                       11  $16 \times 5$   
 6  $48 \times 50$                       12  $28 \times 5$   
 7  $37 \times 50$                       13  $34 \times 5$

Work out by doubling.

- 14  $1 \times 12 = \square$                       15  $1 \times 18 = \square$   
 $2 \times 12 = \square$                        $2 \times 18 = \square$   
 $4 \times 12 = \square$                        $4 \times 18 = \square$   
 $8 \times 12 = \square$                        $8 \times 18 = \square$   
 $16 \times 12 = \square$                        $16 \times 18 = \square$

Use halving to solve.

- 16  $\frac{1}{2}$  of 60 =  $\square$                       17  $\frac{1}{3}$  of 30 =  $\square$   
 $\frac{1}{4}$  of 60 =  $\square$                        $\frac{1}{6}$  of 30 =  $\square$   
 $\frac{1}{8}$  of 60 =  $\square$                        $\frac{1}{12}$  of 30 =  $\square$

**B**

- 1 Make the 18 times-table by doubling the 9 times-table.

Work out by doubling or halving.  
Show the method used.

- |                  |                   |
|------------------|-------------------|
| 2 $14 \times 17$ | 8 $29 \times 25$  |
| 3 $18 \times 28$ | 9 $35 \times 25$  |
| 4 $16 \times 19$ | 10 $47 \times 25$ |
| 5 $19 \times 15$ | 11 $16 \times 75$ |
| 6 $26 \times 15$ | 12 $18 \times 55$ |
| 7 $33 \times 15$ | 13 $22 \times 45$ |

Work out some multiples of 32 by doubling.  
Use them to work out:

- |                   |                   |
|-------------------|-------------------|
| 14 $12 \times 32$ | 17 $11 \times 32$ |
| 15 $22 \times 32$ | 18 $25 \times 32$ |
| 16 $17 \times 32$ | 19 $19 \times 32$ |

Copy and complete. Use halving to solve the second and third problems.

- |                         |                          |
|-------------------------|--------------------------|
| 20 $\frac{1}{3}$ of 3   | 23 $\frac{1}{3}$ of 6000 |
| $\frac{1}{6}$ of 3      | $\frac{1}{6}$ of 6000    |
| $\frac{1}{12}$ of 3     | $\frac{1}{12}$ of 6000   |
| 21 $\frac{1}{3}$ of 150 | 24 $\frac{1}{3}$ of 18   |
| $\frac{1}{6}$ of 150    | $\frac{1}{6}$ of 18      |
| $\frac{1}{12}$ of 150   | $\frac{1}{12}$ of 18     |
| 22 $\frac{1}{3}$ of 42  | 25 $\frac{1}{3}$ of 90   |
| $\frac{1}{6}$ of 42     | $\frac{1}{6}$ of 90      |
| $\frac{1}{12}$ of 42    | $\frac{1}{12}$ of 90     |

Copy and complete.

Use halving to solve the second problem.

- |                          |                          |
|--------------------------|--------------------------|
| 26 $\frac{1}{10}$ of 41  | 29 $\frac{1}{10}$ of 3   |
| $\frac{1}{20}$ of 41     | $\frac{1}{20}$ of 3      |
| 27 $\frac{1}{10}$ of 290 | 30 $\frac{1}{10}$ of 0.4 |
| $\frac{1}{20}$ of 290    | $\frac{1}{20}$ of 0.4    |
| 28 $\frac{1}{10}$ of 50  | 31 $\frac{1}{10}$ of 1.8 |
| $\frac{1}{20}$ of 50     | $\frac{1}{20}$ of 1.8    |

**C**

Work out by doubling or halving.  
Show the method used.

- |                    |                    |
|--------------------|--------------------|
| 1 $3.1 \times 18$  | 7 $3.9 \times 25$  |
| 2 $0.43 \times 16$ | 8 $5.7 \times 25$  |
| 3 $2.3 \times 14$  | 9 $0.46 \times 25$ |
| 4 $1.7 \times 15$  | 10 $19 \times 3.5$ |
| 5 $15 \times 6.3$  | 11 $24 \times 4.5$ |
| 6 $8.7 \times 15$  | 12 $72 \times 35$  |

Work out some multiples of 36.

Use them to work out.

- |                   |                   |
|-------------------|-------------------|
| 13 $9 \times 36$  | 16 $21 \times 36$ |
| 14 $26 \times 36$ | 17 $13 \times 36$ |
| 15 $15 \times 36$ | 18 $28 \times 36$ |

Find one twelfth of each number by halving one third and halving again.

- |        |         |        |        |
|--------|---------|--------|--------|
| 19 270 | 21 15   | 23 45  | 25 0.3 |
| 20 0.6 | 22 0.36 | 24 6.9 | 26 51  |

Find one twentieth of each number by halving one tenth.

- |        |         |        |        |
|--------|---------|--------|--------|
| 27 0.3 | 29 0.08 | 31 2.9 | 33 61  |
| 28 39  | 30 7    | 32 0.5 | 34 1.3 |

- 35 Copy and complete these times tables.

12 times-table	24 times-table	48 times-table
12	24	48
24		
36		
48		
60		
72		
84		
96		
108		
120	240	480

# INFORMAL METHOD FOR MULTIPLICATION

On this page you will learn the grid method for multiplication.

## Examples

$2397 \times 6$

×	2000	300	90	7	= 14382
6	12000	1800	540	42	

$356 \times 24$

×	300	50	6	7120
20	6000	1000	120	
4	1200	200	24	+ 1424
				8544

## A

Copy and complete.

1  $\times \begin{array}{|c|c|c|} \hline 200 & 60 & 7 \\ \hline \end{array} =$

2  $\times \begin{array}{|c|c|c|} \hline 100 & 40 & 5 \\ \hline \end{array} =$

3  $\times \begin{array}{|c|c|} \hline 40 & 2 \\ \hline \end{array} =$

4  $\times \begin{array}{|c|c|} \hline 60 & 3 \\ \hline \end{array} =$

5  $\times \begin{array}{|c|c|} \hline 50 & 4 \\ \hline \end{array} =$

6  $\times \begin{array}{|c|c|} \hline 80 & 5 \\ \hline \end{array} =$

Use the grid method.

7  $396 \times 4$

8  $283 \times 6$

9  $314 \times 9$

10  $527 \times 8$

11  $97 \times 15$

12  $64 \times 24$

13  $36 \times 47$

14  $58 \times 32$

## B

Copy and complete.

1  $\times \begin{array}{|c|c|c|c|} \hline 3000 & 700 & 50 & 2 \\ \hline \end{array} =$

2  $\times \begin{array}{|c|c|c|c|} \hline 1000 & 300 & 60 & 4 \\ \hline \end{array} =$

3  $\times \begin{array}{|c|c|c|} \hline 100 & 40 & 9 \\ \hline \end{array} =$

4  $\times \begin{array}{|c|c|c|} \hline 200 & 70 & 5 \\ \hline \end{array} =$

5  $\times \begin{array}{|c|c|c|} \hline 300 & 50 & 6 \\ \hline \end{array} =$

6  $\times \begin{array}{|c|c|c|} \hline 400 & 30 & 8 \\ \hline \end{array} =$

Use the grid method.

7  $2950 \times 7$

8  $2197 \times 9$

9  $4583 \times 6$

10  $4168 \times 8$

11  $282 \times 37$

12  $363 \times 18$

13  $394 \times 29$

14  $672 \times 35$

## C

Copy and complete.

1  $\times \begin{array}{|c|c|c|} \hline 100 & 60 & 7 \\ \hline \end{array} =$

2  $\times \begin{array}{|c|c|c|} \hline 200 & 40 & 9 \\ \hline \end{array} =$

3  $\times \begin{array}{|c|c|c|} \hline 200 & 50 & 6 \\ \hline \end{array} =$

4  $\times \begin{array}{|c|c|c|} \hline 400 & 20 & 8 \\ \hline \end{array} =$

Use the grid method.

5  $5263 \times 7$

6  $6378 \times 6$

7  $465 \times 132$

8  $384 \times 271$

9  $539 \times 365$

10  $613 \times 287$

- 11 In one week 154 factory workers earn £347 each. What is the total wage bill?

# STANDARD METHOD FOR SHORT MULTIPLICATION — 59

On this page you will learn a standard method for short multiplication.

## Examples

Method 1

$$\begin{array}{r}
 4273 \\
 \times \quad 8 \\
 \hline
 4000 \times 8 \quad 32000 \\
 200 \times 8 \quad 1600 \\
 70 \times 8 \quad 560 \\
 3 \times 8 \quad 24 \\
 \hline
 34184 \\
 \hline
 \end{array}$$

Method 2

$$\begin{array}{r}
 4273 \\
 \times \quad 8 \\
 \hline
 34184 \\
 \hline
 \end{array}$$

Work from the right and carry.

## A

Copy and complete.

1

$$\begin{array}{r}
 2389 \\
 \times \quad 5 \\
 \hline
 2000 \times 5 \\
 300 \times 5 \\
 80 \times 5 \\
 9 \times 5 \quad \underline{\quad}
 \end{array}$$

2

$$\begin{array}{r}
 2683 \\
 \times \quad 7 \\
 \hline
 2000 \times 7 \\
 600 \times 7 \\
 80 \times 7 \\
 3 \times 7 \quad \underline{\quad}
 \end{array}$$

3

$$\begin{array}{r}
 5476 \\
 \times \quad 8 \\
 \hline
 5000 \times 8 \\
 400 \times 8 \\
 70 \times 8 \\
 6 \times 8 \quad \underline{\quad}
 \end{array}$$

## B

Use Method 1.

1	$3968$	4	$1927$
	$\times \quad 3$		$\times \quad 8$
2	$4576$	5	$4759$
	$\times \quad 4$		$\times \quad 6$
3	$3758$	6	$2679$
	$\times \quad 9$		$\times \quad 7$

Use Method 2.

7	$2436$	11	$3839$
	$\times \quad 5$		$\times \quad 7$
8	$2484$	12	$3276$
	$\times \quad 6$		$\times \quad 6$
9	$1546$	13	$2385$
	$\times \quad 8$		$\times \quad 8$
10	$2367$	14	$4809$
	$\times \quad 9$		$\times \quad 9$

## C

Use Method 2.

1	$2763 \times 6$
2	$3879 \times 4$
3	$2729 \times 9$
4	$1681 \times 8$
5	$2675 \times 7$
6	$4829 \times 3$
7	$2736 \times 7$
8	$3547 \times 6$
9	$2974 \times 9$
10	$3192 \times 6$

11 Each month an architect earns £2374. How much does he earn in 6 months?



12 The mean daily audience at a cinema is 1957. What is the total audience for the week?

On this page you will learn a standard method for the multiplication of decimals.

**Examples**

$4.3 \times 6$

$4.0 \times 6 = 24.0$

$$\begin{array}{r} 0.3 \times 6 = 1.8 \\ \hline 25.8 \end{array}$$

$2.57 \times 4$

$2.0 \times 4 = 8.0$

$0.5 \times 4 = 2.0$

$$\begin{array}{r} 0.07 \times 4 = 0.28 \\ \hline 10.28 \end{array}$$

$3.692 \times 7$

$3.0 \times 7 = 21.0$

$0.6 \times 7 = 4.2$

$0.09 \times 7 = 0.63$

$0.002 \times 7 = 0.014$

$$\begin{array}{r} 21.0 \\ 4.2 \\ 0.63 \\ 0.014 \\ \hline 25.844 \end{array}$$



Make sure that the decimal points are all in line.

**A**

Copy and complete.

1  $8.6 \times 2$     $8.0 \times 2 = \square$   
 $0.6 \times 2 = \square$   
 $\square$

2  $3.4 \times 8$     $3.0 \times 8 = \square$   
 $0.4 \times 8 = \square$   
 $\square$

3  $2.3 \times 6$     $2.0 \times 6 = \square$   
 $0.3 \times 6 = \square$   
 $\square$

4  $6.9 \times 5$     $6.0 \times 5 = \square$   
 $0.9 \times 5 = \square$   
 $\square$

5  $3.5 \times 9$     $3.0 \times 9 = \square$   
 $0.5 \times 9 = \square$   
 $\square$

6  $4.2 \times 7$     $4.0 \times 7 = \square$   
 $0.2 \times 7 = \square$   
 $\square$

- 7 A sprinkler uses 5.8 litres of water in one minute. How much water does it use in 4 minutes?

**B**

In each problem:

- a) write down the multiplication.  
 (Example: In Question 1 we have  $4.96 \times 3$ )

- b) work out each bracket and find the total.

1  $(4.0 \times 3) + (0.9 \times 3) + (0.06 \times 3)$

2  $(3.0 \times 6) + (0.2 \times 6) + (0.04 \times 6)$

3  $(7.0 \times 8) + (0.2 \times 8) + (0.04 \times 8)$

4  $(6.0 \times 7) + (0.5 \times 7) + (0.02 \times 7)$

5  $(5.0 \times 9) + (0.3 \times 9) + (0.02 \times 9)$

6  $(8.0 \times 5) + (0.9 \times 5) + (0.07 \times 5)$

7  $(9.0 \times 4) + (0.4 \times 4) + (0.06 \times 4)$

8  $(3.0 \times 7) + (0.8 \times 7) + (0.05 \times 7)$

Set out as in the examples above.

9  $2.48 \times 7$

15  $9.73 \times 3$

10  $9.53 \times 8$

16  $3.95 \times 7$

11  $3.78 \times 4$

17  $7.68 \times 5$

12  $0.54 \times 6$

18  $6.59 \times 9$

13  $5.47 \times 9$

19  $3.89 \times 6$

14  $8.27 \times 8$

20  $6.58 \times 8$

- 21 One stone equals 6.35 kg.

Niamh weighs 8 stones.

How much does she weigh in kilograms?

**C**

1  $3.163 \times 6$

2  $0.247 \times 5$

3  $5.938 \times 3$

4  $5.723 \times 9$

5  $8.362 \times 7$

6  $4.671 \times 8$

7  $2.945 \times 4$

8  $7.283 \times 9$

9  $4.874 \times 7$

10  $9.284 \times 8$

11  $6.754 \times 6$

12  $7.456 \times 9$

13  $2.31 \times 16$

14  $3.54 \times 24$

15  $4.67 \times 32$

16  $2.95 \times 52$

17  $5.34 \times 45$

18  $3.78 \times 34$

19  $8.57 \times 27$

20  $4.86 \times 63$

# LONG MULTIPLICATION

On this page you will learn a standard method for long multiplication.

## Examples

$$\begin{array}{r} 46 \\ \times 35 \\ \hline 40 \times 35 \quad 1400 \\ 6 \times 35 \quad \quad 210 \\ \hline 1610 \end{array}$$

$$\begin{array}{r} 246 \\ \times 35 \\ \hline 200 \times 35 \quad 7000 \\ 40 \times 35 \quad 1400 \\ 6 \times 35 \quad \quad 210 \\ \hline 8610 \end{array}$$



### A

Copy and complete.

1 
$$\begin{array}{r} 41 \\ \times 13 \\ \hline 41 \times 10 \\ 41 \times 3 \quad \_ \end{array}$$

2 
$$\begin{array}{r} 51 \\ \times 23 \\ \hline 51 \times 20 \\ 51 \times 3 \quad \_ \end{array}$$

3 
$$\begin{array}{r} 32 \\ \times 13 \\ \hline 32 \times 10 \\ 32 \times 3 \quad \_ \end{array}$$

4 
$$\begin{array}{r} 25 \\ \times 15 \\ \hline 25 \times 10 \\ 25 \times 5 \quad \_ \end{array}$$

Work out

- 5  $38 \times 15$     8  $67 \times 29$   
 6  $45 \times 26$     9  $59 \times 42$   
 7  $83 \times 37$     10  $74 \times 34$

### B

Copy and complete.

1 
$$\begin{array}{r} 163 \\ \times 16 \\ \hline 163 \times 10 \\ 163 \times 6 \quad \_ \end{array}$$

2 
$$\begin{array}{r} 381 \\ \times 25 \\ \hline 381 \times 20 \\ 381 \times 5 \quad \_ \end{array}$$

3 
$$\begin{array}{r} 258 \\ \times 38 \\ \hline 258 \times 30 \\ 258 \times 8 \quad \_ \end{array}$$

4 
$$\begin{array}{r} 429 \\ \times 43 \\ \hline 429 \times 40 \\ 429 \times 3 \quad \_ \end{array}$$

Work out

- 5  $347 \times 28$     8  $386 \times 52$   
 6  $439 \times 32$     9  $468 \times 26$   
 7  $292 \times 19$     10  $534 \times 37$

### C

Copy and complete.

1 
$$\begin{array}{r} 217 \\ \times 124 \\ \hline 217 \times 100 \\ 217 \times 20 \\ 217 \times 4 \quad \_ \end{array}$$

2 
$$\begin{array}{r} 531 \\ \times 245 \\ \hline 531 \times 200 \\ 531 \times 40 \\ 531 \times 5 \quad \_ \end{array}$$

Work out

- 3  $284 \times 139$     7  $315 \times 259$   
 4  $423 \times 256$     8  $234 \times 167$   
 5  $336 \times 194$     9  $543 \times 293$   
 6  $528 \times 127$     10  $348 \times 326$

11 A book has 184 pages. The mean number of words per page is 317. How many words are there in the book?

12 A film company hires 426 extras to film crowd scenes. They are paid £275 each. What is the total wage bill?

On this page you will learn an informal method for division.

**Examples**

$$231 \div 6$$

$$\text{Approximate } 180 \div 6 = 30$$

$$240 \div 6 = 40$$

$231 \div 6$  lies between 30 and 40.

$$\begin{array}{r} \text{Calculate } 231 \\ - \underline{60} \quad (10 \times 6) \\ 171 \\ - \underline{120} \quad (20 \times 6) \\ 51 \\ - \underline{48} \quad (8 \times 6) \\ 3 \end{array}$$

Answer 38 remainder 3

$$618 \div 22$$

$618 \div 22$  is approximately  $600 \div 20$  which is 30.

$$\begin{array}{r} \text{Calculate } 618 \\ - \underline{220} \quad (10 \times 22) \\ 398 \\ - \underline{220} \quad (10 \times 22) \\ 178 \\ - \underline{110} \quad (5 \times 22) \\ 68 \\ - \underline{66} \quad (3 \times 22) \\ 2 \end{array}$$

Answer 28 remainder 2

**A**

Work out

- 1  $116 \div 5$
- 2  $110 \div 6$
- 3  $170 \div 7$
- 4  $199 \div 8$
- 5  $116 \div 9$
- 6  $238 \div 5$
- 7  $253 \div 8$
- 8  $261 \div 7$
- 9  $142 \div 6$
- 10  $193 \div 9$
- 11  $171 \div 4$
- 12  $212 \div 8$
- 13  $211 \div 6$
- 14  $306 \div 7$
- 15  $329 \div 5$
- 16  $320 \div 9$

**B**

Work out

- |                 |                  |
|-----------------|------------------|
| 1 $217 \div 14$ | 9 $634 \div 51$  |
| 2 $660 \div 31$ | 10 $970 \div 44$ |
| 3 $602 \div 24$ | 11 $956 \div 27$ |
| 4 $686 \div 42$ | 12 $746 \div 45$ |
| 5 $900 \div 37$ | 13 $581 \div 22$ |
| 6 $841 \div 38$ | 14 $830 \div 39$ |
| 7 $586 \div 13$ | 15 $630 \div 26$ |
| 8 $640 \div 36$ | 16 $999 \div 33$ |

- 17 A tourist exchanges £46 for 598 Swedish kroner. How many kronor would £1 buy?

**C**

Work out

- |                  |                   |
|------------------|-------------------|
| 1 $490 \div 23$  | 7 $706 \div 32$   |
| 2 $567 \div 15$  | 8 $1066 \div 26$  |
| 3 $1176 \div 21$ | 9 $1321 \div 43$  |
| 4 $1000 \div 24$ | 10 $774 \div 29$  |
| 5 $619 \div 18$  | 11 $982 \div 37$  |
| 6 $830 \div 16$  | 12 $1066 \div 19$ |

- 13 There are 32 screws in each bag. How many bags can be filled from 1504 screws?
- 14 24 identical crates weigh 864 kg altogether. What is the weight of one crate?
- 15 Aaron earns £19 656 in a year. How much is he paid each week?



# STANDARD METHOD FOR DIVISION

On this page you will learn a standard written method for division.

## SHORT DIVISION

$$\begin{array}{r} 32 \text{ R4} \\ 6 \overline{)196} \\ - 18 \quad (3 \times 6) \\ \hline 16 \\ - 12 \quad (2 \times 6) \\ \hline 4 \end{array}$$

## LONG DIVISION

$$\begin{array}{r} 26 \overline{)884} \\ - 780 \quad (30 \times 26) \\ \hline 104 \\ - 104 \quad (4 \times 26) \\ \hline 0 \end{array}$$

or

$$\begin{array}{r} 34 \\ 26 \overline{)884} \\ - 78 \quad (3 \times 26) \\ \hline 104 \\ - 104 \quad (4 \times 26) \\ \hline 0 \end{array}$$

Answer = 34

## DIVISION OF DECIMALS

$$\begin{array}{r} 7 \overline{)87.5} \\ - 70.0 \quad (10 \times 7) \\ \hline 17.5 \\ - 14.0 \quad (2 \times 7) \\ \hline 3.5 \\ - 3.5 \quad (0.5 \times 7) \\ \hline 0.0 \end{array}$$

Answer = 12.5

### A

Set out as in the short division example above.

- 1  $257 \div 6$
- 2  $268 \div 7$
- 3  $206 \div 8$
- 4  $553 \div 9$
- 5  $228 \div 5$
- 6  $385 \div 8$
- 7  $381 \div 7$
- 8  $234 \div 9$
- 9  $437 \div 8$
- 10  $855 \div 9$
- 11  $201 \div 7$
- 12  $664 \div 8$

13 Eight sweets weigh 224 grams. What is the weight of one sweet?

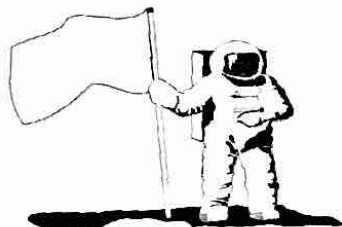
14 A prize of £162 is shared by six winners. How much should each person receive?

### B

Work out

- |                        |                          |
|------------------------|--------------------------|
| 1 $9 \overline{)423}$  | 7 $24 \overline{)912}$   |
| 2 $8 \overline{)375}$  | 8 $32 \overline{)928}$   |
| 3 $6 \overline{)327}$  | 9 $5 \overline{)66.5}$   |
| 4 $7 \overline{)483}$  | 10 $6 \overline{)128.4}$ |
| 5 $13 \overline{)351}$ | 11 $8 \overline{)210.4}$ |
| 6 $17 \overline{)578}$ | 12 $7 \overline{)224.7}$ |

13 An astronaut weighs 76.8 kilograms. On the Moon he weighs one sixth of his weight on Earth. How much does he weigh on the Moon?



### C

Set out as in the examples.

- |                  |                    |
|------------------|--------------------|
| 1 $410 \div 19$  | 9 $537.6 \div 8$   |
| 2 $800 \div 28$  | 10 $67.34 \div 7$  |
| 3 $789 \div 36$  | 11 $190.4 \div 14$ |
| 4 $861 \div 26$  | 12 $388.8 \div 16$ |
| 5 $615 \div 47$  | 13 $515.2 \div 23$ |
| 6 $22.68 \div 7$ | 14 $999.6 \div 21$ |
| 7 $411.3 \div 9$ | 15 $880.2 \div 27$ |
| 8 $50.58 \div 6$ | 16 $697.3 \div 19$ |

17 A full bucket of water is poured into an empty fish tank seven times. The tank now has 57.96 litres of water. What is the capacity of the bucket?



18 Lloyd saves £35 each week. How long will it take him to save £840?

On these pages you will learn:

- to recognise a negative number output.

**Example**  $4 - 6$

Press  $\boxed{C} \boxed{4} \boxed{-} \boxed{6} \boxed{=} \rightarrow -2$



- to key in and interpret money calculations.

**Example**  $£2.48 + 62p$  Change 62p to £0.62

Press  $\boxed{C} \boxed{2} \boxed{.} \boxed{4} \boxed{8} \boxed{+} \boxed{0} \boxed{.} \boxed{6} \boxed{2} \boxed{=} \rightarrow 3.1$  Answer = £3.10

- to carry out calculations involving more than one step.

**Example**  $6 \times (29 + 32)$  Operation in brackets first.

Press  $\boxed{C} \boxed{2} \boxed{9} \boxed{+} \boxed{3} \boxed{2} \boxed{=} \boxed{\times} \boxed{6} \boxed{=} \rightarrow 366$

- to use the calculator's memory.

**Example**  $(32 + 41) \times (87 + 48)$

Press  $\boxed{MRC} \boxed{C} \boxed{3} \boxed{2} \boxed{+} \boxed{4} \boxed{1} \boxed{=} \boxed{M+} \boxed{C} \boxed{8} \boxed{7} \boxed{+} \boxed{4} \boxed{8} \boxed{=} \boxed{\times}$   
 $\boxed{MRC} \boxed{=} \rightarrow 9855$

- to key in fractions and interpret the decimal answer displayed.

**Example**  $\frac{2}{7}$  rounded to decimal places.

Press  $\boxed{C} \boxed{2} \boxed{\div} \boxed{7} \boxed{=} \rightarrow 0.2857142$  Answer = 0.29, correct to 2 decimal places

**Example**  $\frac{1}{3}$

Press  $\boxed{C} \boxed{1} \boxed{\div} \boxed{3} \boxed{=} \rightarrow 0.3333333$

This is an example of a recurring decimal.

**A**

Use a calculator to work out the problems and interpret the display.

- |             |                         |                             |
|-------------|-------------------------|-----------------------------|
| 1 $12 - 93$ | 7 $7.56 + 82p + 79p$    | 13 $£43.20 \div 16$         |
| 2 $24 - 84$ | 8 $£6.37 + 98p + 67p$   | 14 $£58.90 \times 19$       |
| 3 $45 - 72$ | 9 $£11.47 - 76p - 84p$  | 15 $83.2 + (2.8 \times 6)$  |
| 4 $33 - 59$ | 10 $£12.00 - 45p - 92p$ | 16 $5 \times (11.5 - 6.97)$ |
| 5 $26 - 68$ | 11 $£3.45 \times 24$    | 17 $1.56 + (2.74 \times 6)$ |
| 6 $38 - 79$ | 12 $£2.35 \times 38$    | 18 $8 \times (6.4 - 3.9)$   |

Arrange these fractions in order, smallest first.

- |   |   |  |
|---|---|--|
| 19 $\frac{1}{3} \quad \frac{3}{8} \quad \frac{7}{20}$ | 20 $\frac{13}{25} \quad \frac{23}{40} \quad \frac{9}{16}$ | 21 $\frac{2}{5} \quad \frac{7}{18} \quad \frac{5}{12}$ |
|---|---|--|

**B**

Use a calculator to work out the problems and interpret the display.

- |                 |                             |                                   |
|-----------------|-----------------------------|-----------------------------------|
| 1 $2.7 - 6.2$   | 7 $(£2.76 + 69p) \times 8$  | 13 $(92 - 65) \times (46 + 87)$   |
| 2 $3.6 - 8.3$   | 8 $(£6.35 - 87p) \times 5$  | 14 $(66 + 49) \times (63 - 27)$   |
| 3 $1.2 - 7.54$  | 9 $(£4.36 - 68p) \times 15$ | 15 $(84 - 38) \times (47 + 29)$   |
| 4 $4.5 - 5.93$  | 10 $(£3.12 - 57p) \times 4$ | 16 $(173 - 128) \times (94 - 67)$ |
| 5 $3.14 - 9.75$ | 11 $(£36.44 + 76p) \div 8$  | 17 $(64 - 38) \times (4.7 + 2.9)$ |
| 6 $5.32 - 11.4$ | 12 $(£77.83 + 57p) \div 16$ | 18 $(5.4 - 2.9) \times (68 + 47)$ |

Arrange these fractions in order, smallest first.

- |   |  |  |
|---|--|--|
| 19 $\frac{2}{7} \quad \frac{3}{11} \quad \frac{7}{24} \quad \frac{4}{15}$ | 20 $\frac{3}{5} \quad \frac{2}{3} \quad \frac{4}{7} \quad \frac{5}{9}$ | 21 $\frac{17}{20} \quad \frac{5}{6} \quad \frac{13}{15} \quad \frac{21}{25}$ |
|---|--|--|

**C**

Use a calculator to solve these problems.

- 1 A policeman has £3648.20 in a savings account at the start of the year. He makes no withdrawals. His monthly salary of £1,524 is paid into the account. How much money is in the account at the end of the year?



- 2 Ian has £28.40 in his bank account. He buys 6 shirts costing £15.40 each. He pays with a cheque. By how much will he be overdrawn?
- 3 Write down the fractions which have these decimal equivalents.  
[Hint: Try dividing by 3, 6, 7, 9 etc]

- |             |             |              |              |
|-------------|-------------|--------------|--------------|
| a) 0.111111 | d) 0.333333 | g) 0.1428571 | j) 0.090909  |
| b) 0.222222 | e) 0.166666 | h) 0.4285714 | k) 0.181818  |
| c) 0.777777 | f) 0.833333 | i) 0.8571428 | l) 0.5454545 |

On this page you will use a calculator to solve problems.

## A

Copy and complete by writing the missing number in the box.

- 1  $1.68 + \square = 2.57$
- 2  $3.45 + \square = 5.63$
- 3  $\square + 1.43 = 4.39$
- 4  $\square + 0.78 = 2.11$
- 5  $3.21 - \square = 1.68$
- 6  $4.37 - \square = 0.94$
- 7  $\square - 1.57 = 2.24$
- 8  $\square - 3.86 = 4.49$
- 9  $2.97 + \square = 5.32$
- 10  $4.49 + \square = 5.16$
- 11  $\square - 3.75 = 0.68$
- 12  $\square - 1.83 = 6.47$

Find three consecutive numbers which add up to:

- 13 81                      15 195
- 14 114                    16 222

17 Find three quarters of 26.

18 Danielle earns £5.90 per hour. How much does she earn in a week in which she works for 42 hours?



## B

Copy and complete by writing the missing number in the box.

- 1  $4.35 + \square = 6.24$
- 2  $\square + 1.47 = 3.31$
- 3  $8.39 - \square = 1.64$
- 4  $\square - 2.75 = 3.58$
- 5  $6.23 \times \square = 43.61$
- 6  $\square \times 9 = 22.77$
- 7  $26.08 \div \square = 3.26$
- 8  $\square \div 6 = 4.63$

Find two consecutive numbers with a product of:

- 9 306                      11 1190
- 10 506                    12 2256

13 The temperature is  $4.7^{\circ}\text{C}$ . It falls  $8.65^{\circ}\text{C}$ . What is the new temperature?

14 What is 28% of £335?

15



The programmes for a circus cost 65p. Programme sales raise £732.55. How many programmes are sold?

16 One pound equals 1.4 dollars. Phoebe has 304.15 dollars. How much is this in pounds and pence?

## C

1 15,289 people visit a castle in July. £55,040.40 is raised by the sale of entrance tickets. What is the cost of each ticket?

2 The maximum temperature recorded in one year in London was  $28.4^{\circ}\text{C}$ . The range of the temperatures recorded was  $37.6^{\circ}\text{C}$ . What was the minimum temperature?

3 The mean weight of the children in a class is 38 kg. Their total weight is 1026 kg. How many children are there in the class?

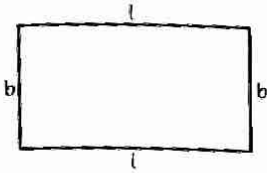
4 74% of the electors voted for the winning candidate. 9100 people voted for the other candidates. How many people voted for the winning candidate?

5 A vertical mine shaft is 328 metres deep. The entrance to the shaft is 136 metres above sea level. How far below sea level is the bottom of the shaft?

# WRITING A FORMULA

On this page you will learn to write and use formulae.

## Examples



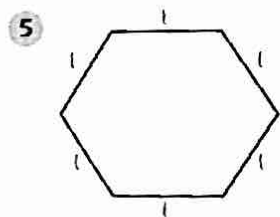
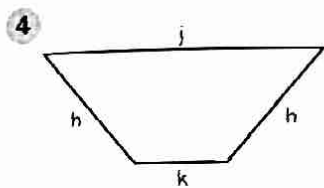
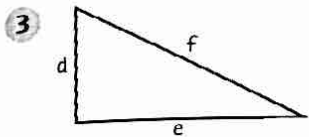
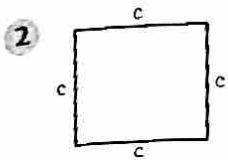
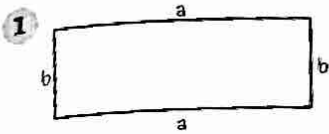
There are  $x$  people on a bus. One half of the passengers get off and 4 people get on. How many passengers ( $p$ ) are on the bus?

$p = 2l + 2b$ , where  $p$  = perimeter

$p = \frac{x}{2} + 4$

## A

Find the perimeter ( $p$ ) of each shape.



## B

Draw and label the shape whose perimeter is given by each formula.

- 1 a triangle  
 $p = 3a$
- 2 an irregular pentagon  
 $p = 3b + 2c$
- 3 a quadrilateral  
 $p = 3d + e$
- 4 an irregular hexagon  
 $p = 3f + 2g + h$
- 5 Find the cost of:
  - a) 10 pens at  $x$  pence each
  - b)  $y$  sweets at 20 pence each.
- 6 A car has  $x$  litres of petrol in its tank. One half is used on Monday. A further 2 litres on Tuesday. How much petrol is left?

## C

In the example above, the area ( $a$ ) of the rectangle is given by the formula  $a = lb$ . (This means  $l \times b$ .)

- 1 Write a formula for the area ( $a$ ) of the first three shapes in Section A.
  - a) days ( $d$ ) in  $w$  weeks.
  - b) months ( $m$ ) in  $y$  years.
  - c) months ( $m$ ) in  $d$  decades.
- 2 Write a formula for the number of:
  - a) 2, 4, 6, 8, 10
  - b) 3, 6, 9, 12, 15
  - c) -3, -2, -1, 0, 1
  - d) 1, 4, 9, 16, 25
  - e) 0.5, 1, 1.5, 2, 2.5
  - f) 1, 3, 5, 7, 9
- 3 Write a formula for the  $n$ th term of each sequence.

On this page you will practise finding examples to match a general statement.

### Examples

1. When you add two odd numbers, the answer is an even number.

$$5 + 11 = 16 \quad 7 + 3 = 10$$

2. A multiple of 16 is also a multiple of 8.  
 $48 = 3 \times 16$  and  $48 = 6 \times 8$

### A

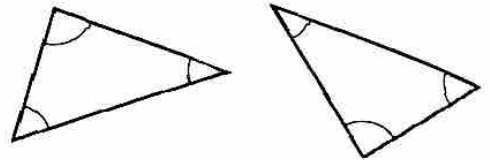
Find two examples that match these statements.

- 1 The sum of three consecutive numbers is three times the middle number.
- 2 To multiply a number by 50, multiply by 100 and halve the answer.
- 3 Dividing a number by 1 leaves the number unchanged.
- 4 Multiplying a decimal number by 100 moves every digit two places to the left.
- 5 The sum of the angles on a straight line is 180 degrees.
- 6 A multiple of 9 is also a multiple of 3.
- 7 The difference between two successive square numbers increases by two each time.

### B

Find three examples that match these statements.

- 1 The sum of four consecutive numbers is double the sum of the middle pair of numbers.
- 2 To multiply a number by 25, multiply by 100 and divide the answer by 4.
- 3 Dividing a whole number by 0.5 makes the number twice as big.
- 4 Multiplying a decimal number by 1000 moves every digit three places to the left.
- 5 The sum of the angles in a triangle is 180 degrees.
- 6 A multiple of 12 is also a multiple of 6.
- 7 The difference between successive triangular numbers increases by one each time.



### C

Find three examples that match these statements.

- 1 The sum of five consecutive numbers is five times the middle number.
- 2 To multiply a number by 15, multiply by 10, halve the answer and add the two parts.
- 3 Any square number is the sum of two consecutive triangular numbers.
- 4 Dividing a number by 0.1 makes the number ten times as big.
- 5 Dividing a number by 1000 moves every digit three places to the right.
- 6 The sum of the angles in a quadrilateral is 360 degrees.
- 7 A multiple of 18 is also a multiple of 3.

A

1	2		3	4	5
6		7		8	
	9		10		
11			12	13	
14	15			16	17
18			19		

Clues across

- 1  $4 \times 19$
- 3  $31 \times 4$
- 6  $167 + 41$
- 8  $6 \times 7$
- 9  $11.6 \times 10$
- 12  $123 - 85$
- 14  $928 + 45$
- 16  $530 \div 10$
- 18  $2004 - 1989$
- 19  $401 - 299$

Clues down

- 1  $8 \times 9$
- 2  $542 + 59$
- 4  $6 \times 4$
- 5  $85 \times 5$
- 7  $9^2 \div 3$
- 10  $9 \times 7$
- 11  $224 - 33$
- 13  $8.5 \times 100$
- 15  $300 \div 4$
- 17  $2 \times 2 \times 2 \times 2 \times 2$

B

Clues across

- 1  $413 - 61$
- 3  $0.68 \times 100$
- 5  $3 \times 3 \times 3 \times 3$
- 6  $12^2$
- 7  $980 \div 2$
- 8  $1003 - 985$
- 10  $472 + 256$
- 11  $712 - 618$
- 12  $4006 - 2994$

Clues down

- 1  $770 \div 2$
- 2  $17 \times 3$
- 3  $80 \times 8$
- 4  $173 - 89$
- 6  $0.19 \times 100$
- 7  $5002 - 121$
- 8  $600 \div 5$
- 9  $9 \times 49$
- 10  $355 \div 5$

1	2		3	4
5			6	
		7		
	8			9
10			11	
12				

C

1	2	3		4	5
6			7		
8			9	10	
		11			
12	13			14	15
16				17	

Clues across

- 1  $311 - 92$
- 4  $275 \div 5$
- 6  $7001 - 347$
- 8  $0.069 \times 1000$
- 9  $188 \times 2$
- 11  $422 - 53$
- 12  $21^2$
- 14  $312 - 215$
- 16  $30 \times 25$
- 17  $1.28 \times 50$

Clues down

- 1  $38 \times 7$
- 2  $13^2$
- 3  $50 \times 1.9$
- 5  $358 + 178$
- 7  $54.5 \times 8$
- 10  $10\,003 - 2\,007$
- 11  $(366 + 254) \div 2$
- 12  $(9 \times 8) - 25$
- 13  $360 \div 8$
- 15  $0.37 \times 200$

On these pages you will learn:

- to choose the operation or operations needed to solve word problems.
- to decide whether the calculation will be done mentally or on paper.
- to use all four operations to solve the problems.

Some of the problems require one operation only. Some require more than one.

- a) Safraz has 128 books. Lucy has 96.  
How many do they have altogether?  
 $128 + 96 = 224$   
They have 224 books altogether.



- b) Maurice has 86 postcards.  
Libby has 55 more.  
How many do they have altogether?  
 $86 + 55 = 141$   
 $141 + 86 = 227$   
They have 227 postcards altogether.

- In each section read the problems and decide
  - what operations are needed.
  - whether the calculation will be done mentally or on paper.
 Then solve the problems.

## A

- 1 Abigail is driving 245 miles. She stops for petrol after 87 miles. How much further does she have to drive?



- 2 Connor buys a house for £93 500. When he sells it he makes a profit of £9000. What is the selling price?
- 3 Raoul is one eighth the age of his grandmother. His grandmother is 72. How old is Raoul?
- 4 Six racks of CDs each contained 18 CDs. How many CDs were there?
- 5 A cricket team scored 311 in the first innings of a match and 132 fewer in the second innings. How many did the team score in both innings?
- 6 How many hours are there in three weeks?
- 7 There were 143 skaters on an ice rink. During the next half hour 57 people started skating and 69 people stopped. How many skaters were there now on the rink?
- 8 One quarter of the 128 people on a school trip were adults. How many were children?
- 9 A greengrocer has seven boxes each containing 40 red apples. He also has five boxes of green apples. There are 400 apples altogether. How many green apples are there in each box?
- 10 36 children were asked what was their favourite day of the week. One third chose Saturday and one quarter chose Sunday. How many chose a weekday?



- B**
- 1 There were 216 people on the pier. 98 more people went on the pier while 63 left. How many were there now on the pier?
  - 2 A large store had 288 skirts on display, equally divided between 18 rails. How many skirts were on each rail?
  - 3 In June the average daily audience at a cinema was 240. How many people watched films at the cinema during the month?
  - 4 The Matterhorn is 4428 m high. Owen is 939 m below the summit of the mountain. How high is Owen?
  - 5 Niamh types at 60 words per minute. How long will it take her to type 3000 words?
  - 6 Katharine won a race in a time of 13.86 seconds. Nicola was two tenths of a second slower. What was Nicola's time?


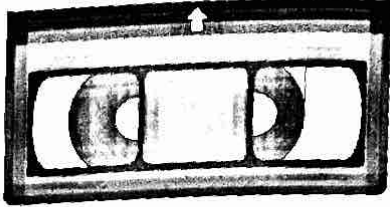


- 7 How many seconds are there in 12 hours?
- 8 An ice cream van has seven packets each containing 60 chocolate flakes. During the day 163 are used. How many flakes are left?
- 9 A display of flowers has three red flowers to every two white flowers. There are 32 white flowers. How many red flowers are there?
- 10 Of the 60 children in Year 6 two fifths had brown hair and three tenths had fair hair. How many of the children had hair of a different colour?

- C**
- 1 The River Nile is 6669 km long. The Yangtze-Kiang is 680 km shorter. How long is the Yangtze-Kiang?
  - 2 The perimeter of a square playground is 120 m. What is the area of the playground?
  - 3 Ashley won a race in 57.92 seconds. Adam was 48 hundredths of a second slower. Robert was seven tenths of a second behind Adam. What was Robert's time?
  - 4 The average attendance at Arsenal's 25 away matches was 32 280. How many spectators watched Arsenal away from home that season?
  - 5 In the Mars General Election the Independence Party polled 7 237 468 votes. 485 624 fewer Martians voted for the Inter Planetary Union Party. How many votes did the Inter Planetary Union Party poll?
  - 6 How many hours are there in a leap year?
  - 7 A sandwich bar makes 540 ham sandwiches every day. One packet of ham makes 15 sandwiches. How many packets does the sandwich bar need?
  - 8 A theme park had 443 300 visitors in July. What was the average number of visitors per day?
  - 9 Freda Frog had 50 tadpoles. All of Freda's children also had 50 tadpoles. All of Freda's grandchildren also had 50 tadpoles. How many great grandchildren does Freda have?
  - 10 Two ninths of the 180 children in a school come by car. Five twelfths of the children walk. How many children travel to school in other ways?

On this page you will solve problems involving money.

**DIXONS - PRICE LIST**

Hi-Fi £124		TV £140	Personal Stereo £35
	Camera £99		Roll of film £4.20
Mouse Pad £3.50		Printer £85	Game Boy £68
	Alarm Clock £14.99		Mobile Phone £73
Audio Tapes 12 for £3.60		Batteries 6 for £4.50	Video Tapes 8 for £14
			

### A

Work out the cost of each purchase and the change from £200.

- 1 a camera and 10 rolls of film
- 2 a hi-fi and 36 audio tapes
- 3 2 mobile phones and 24 batteries
- 4 a TV and 16 video tapes
- 5 a printer and 3 mouse pads



- 6 Find the cost of:
 

a) 1 video tape	b) 1 battery	c) 1 audio tape
-----------------	--------------	-----------------
- 7 How many rolls of film could be bought for £100?
- 8 How many hi-fis could be bought for £1000?
- 9 You buy a camera, an alarm clock and a computer game for £146.49. How much is the computer game?
- 10 You buy a mobile phone and one other item for £158. What is the other item?
- 11 In a sale all the prices are reduced by 10%. Find the cost of:
 

a) the TV	c) the Gameboy
b) the mouse pad	d) the camera

B

Find the value of these sales.

- 1 3 cameras and 20 rolls of film
- 2 2 hi-fis, a personal stereo and 18 batteries
- 3 A TV, a mobile phone and an alarm clock
- 4 4 Game Boys, a printer and 4 mouse pads
- 5 6 personal stereos, 2 cameras, an alarm clock and 60 audio tapes
- 6 Find the cost of:
  - a) 3 video tapes
  - b) 5 batteries
  - c) 7 audio tapes.
- 7 Copy and complete the table by converting the pounds to the foreign currencies.



UK (pounds)	Europe (Euro)	Australia (dollar)	Canada (dollar)
£1.00	1.6	2.4	2.25
£10.00			
£15.00			
£50.00			

C

Find the value of these sales.

- 1 5 cameras, an alarm clock and 100 rolls of film
- 2 6 TVs, a personal stereo and 40 video tapes
- 3 7 hi-fis and 96 audio tapes
- 4 12 Game Boys, 4 alarm clocks and 16 mouse pads
- 5 8 mobile phones, 4 printers and 90 batteries
- 6 How many rolls of film could you buy for £500?
- 7 How many personal stereos could be bought for £1000?
- 8 3 TVs, 24 video tapes and a computer game are bought for £491. How much is the computer game?



- 9 Copy and complete the table by converting the pounds to the foreign currencies.

UK (pounds)	Brazil (real)	U.S.A. (dollar)	India (rupee)
£1.00	2.84	1.45	69.3
£10.00			
£25.00			
£500.00			

- 10 Using the table above, convert:

- a) 145 dollars into pounds
- b) 69 300 rupees into dollars.

On these pages you will learn:

- to use the relationship between metric units of length.

$$\begin{array}{ll} 10 \text{ mm} = 1 \text{ cm} & 100 \text{ cm} = 1 \text{ m} \\ 5 \text{ mm} = 0.5 \text{ cm} & 50 \text{ cm} = 0.5 \text{ m} \\ 1 \text{ mm} = 0.1 \text{ cm} & 10 \text{ cm} = 0.1 \text{ m} \\ 1 \text{ mm} = 0.001 \text{ m} & 1 \text{ cm} = 0.01 \text{ m} \end{array}$$

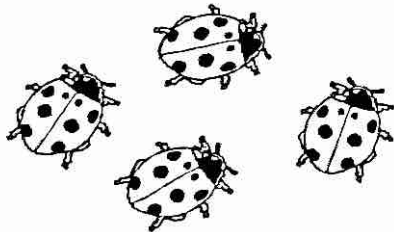
$$\begin{array}{l} 1000 \text{ m} = 1 \text{ km} \\ 500 \text{ m} = 0.5 \text{ km} \\ 100 \text{ m} = 0.1 \text{ km} \\ 10 \text{ m} = 0.01 \text{ km} \\ 1 \text{ m} = 0.001 \text{ km} \end{array}$$

### Examples

$$\begin{array}{ll} 0.4 \text{ m} = \square \text{ cm} & \text{Answer } 40 \text{ cm} \\ 16 \text{ mm} = \square \text{ m} & \text{Answer } 0.016 \text{ m} \\ 4380 \text{ m} = \square \text{ km} & \text{Answer } 4.380 \text{ km} \end{array}$$

- to suggest suitable units to measure lengths.

If the length is less than 1 cm use millimetres.  
If the length is less than 1 m use centimetres.  
If the length is less than 1 km use metres.



We would use millimetres to measure the length of a ladybird.

### A

Copy and complete by writing the missing number in the box.

- 1 2000 m =  km
- 2 3500 m =  km
- 3 2.5 km =  m
- 4 7.400 km =  m
- 5 290 cm =  m
- 6 147 cm =  m
- 7 3.61 m =  cm
- 8 0.87 m =  cm
- 9 37 mm =  cm
- 10 16 mm =  cm
- 11 9 cm =  mm
- 12 0.4 cm =  mm

Suggest a suitable metric unit to measure these lengths.

- 13 a charity walk
- 14 a necklace
- 15 a wood lice
- 16 the height of the classroom
- 17 a spoon
- 18 a cross-Channel swim



Think of three more things you would measure using:

- 19 millimetres
- 20 centimetres
- 21 metres
- 22 kilometres

Write the longest length from each pair.

- 23 1.8 cm    8 mm
- 24 0.2 cm    0.01 m
- 25 6.23 m    623 mm
- 26 90 m    0.1 km
- 27 3.3 cm    50 mm
- 28 370 m    0.04 km

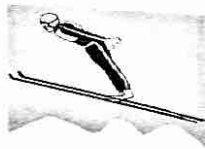
B

Copy and complete.

- 1  $392 \text{ m} = \square \text{ km}$
- 2  $2756 \text{ m} = \square \text{ km}$
- 3  $1.437 \text{ km} = \square \text{ m}$
- 4  $0.026 \text{ km} = \square \text{ m}$
- 5  $240 \text{ cm} = \square \text{ m}$
- 6  $6 \text{ cm} = \square \text{ m}$
- 7  $0.48 \text{ m} = \square \text{ cm}$
- 8  $13.96 \text{ m} = \square \text{ cm}$
- 9  $21 \text{ mm} = \square \text{ m}$
- 10  $685 \text{ mm} = \square \text{ m}$
- 11  $0.007 \text{ m} = \square \text{ mm}$
- 12  $6.937 \text{ m} = \square \text{ mm}$

Suggest a suitable metric unit to measure these lengths.

- 13 a tic tac
- 14 the length of the River Amazon
- 15 a watch strap
- 16 the perimeter of a playground
- 17 a felt tip
- 18 a ski jump



Think of four more things you would measure using:

- 19 millimetres
- 20 centimetres
- 21 metres
- 22 kilometres

Copy and complete by putting  $>$ ,  $<$  or  $=$  in the box.

- 23  $8417 \text{ mm} \square 84.17 \text{ m}$
- 24  $23.1 \text{ cm} \square 0.231 \text{ m}$
- 25  $7 \text{ m} \square 0.007 \text{ km}$
- 26  $2460 \text{ cm} \square 0.024 \text{ km}$
- 27  $5000 \text{ mm} \square 0.05 \text{ km}$
- 28  $200 \text{ mm} \square 0.02 \text{ m}$

C

Copy and complete the tables.

mm	m
1650	→
9	→
	→ 4.218
	→ 0.014

cm	m
3	→
410	→
	→ 0.98
	→ 2.01

m	km
2700	→
3081	→
	→ 0.005
	→ 3.009

cm	mm
	→ 20
0.7	→
	→ 0.3
	→ 17.5

Copy and complete each sentence by choosing the best estimate.

- 5 The height of Mount Everest is (0.89 km, 8.9 km, 0.089 km).
- 6 The thickness of an exercise book is (0.5 cm, 0.05 cm, 0.05 m).
- 7 A bed is (200 mm, 2000 mm, 20 000 mm) long.
- 8 The length of a pair of scissors is (0.13 m, 0.013 m, 13 mm).
- 9 A chair leg is (0.003 m, 0.03 m, 0.3 m) in length.
- 10 The length of a golf drive is (0.28 km, 0.028 km, 2.8 km).



Arrange these lengths in ascending order.

- 11 5005 mm, 5.5 m, 555 cm, 0.005 km
- 12 2700 m, 2.27 km, 0.772 km, 77 000 cm
- 13 0.808 m, 888 mm, 88 cm, 0.008 km
- 14 334 cm, 3.4 m, 0.033 km, 3334 mm

On this page you will learn to solve problems involving length.

## A

- 1 Janice buys 8 shelves. Each shelf is 75 cm long. How many metres of shelving does this provide?
- 2 A square field has a perimeter of 3.6 km. What is the length of one side in metres?
- 3 Six equal lengths are cut from 2 m of string. 20 cm is left over. How long are the lengths of string?
- 4 Jonathan walks for 2.6 km. He rests and then walks a further 1400 m. How far does he walk altogether in kilometres?
- 5 At midday a shadow is 42 cm long. At 6 p.m. it is eight times longer. How long is the shadow at 6 p.m. in metres?
- 6 A mountain peak is 4.26 km above sea level. A climber is 549 m below the summit. How high above sea level is the climber?



## B

- 1 George swims 4 km every day. The pool is 50 m in length. How many lengths does he swim in one week?



- 2 Seema cut 68 cm from 2 m of string. She then cut a further 35 cm. How much string is left?
- 3 A rectangular field is 1586 m long and 234 m wide. How long is the fence around it in kilometres?
- 4 A car travels 25 m every second. How far does it travel in kilometres in five minutes?
- 5 A carpenter needs sixteen 40 cm lengths of wood. How many metres of wood does he need to order?
- 6 In June a plant grew 1.5 metres. On average how much did it grow each day? Give your answer in millimetres.

## C

- 1 A row of trees are 40 m apart. The row runs for 3 km. How many trees are there in the row?
- 2 The average width of Simon's paperback books is 16 mm. How many metres of shelving does he need to store his 275 books?
- 3 A garage entrance is 2.1 m wide. The car is 1.64 m wide. How many centimetres are there between each wall and the car?
- 4 An energetic slug slides 125 cm every hour. How long would it take the slug to travel one kilometre?
- 5 A roll of kitchen towels is 9.68 m long. Each towel is 22 cm long. How many towels are there in each roll?
- 6 A parachutist falls seven ninths of the distance to the ground before opening her parachute at 750 m above ground level. How high was the plane flying when she jumped?



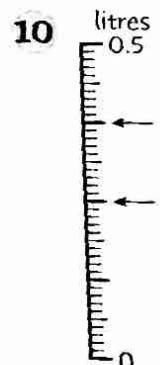
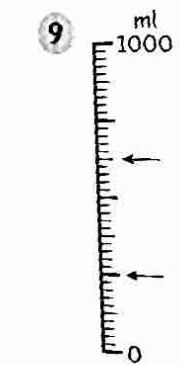
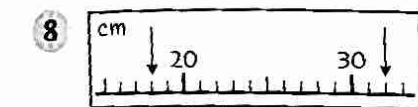
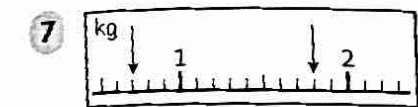
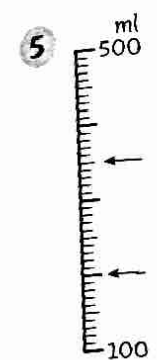
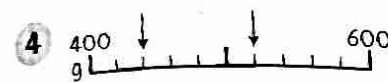
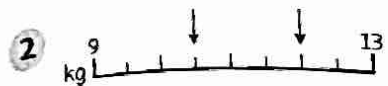
# READING SCALES

On this page you will learn to read scales accurately.

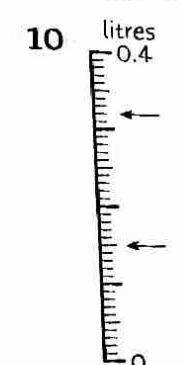
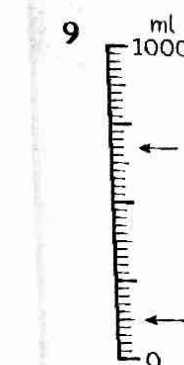
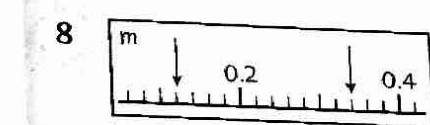
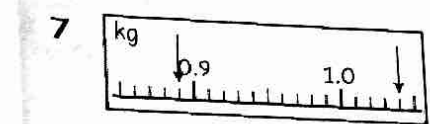
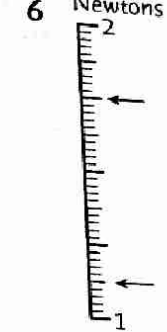
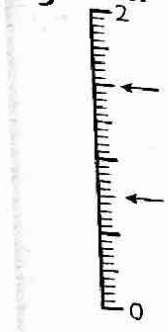
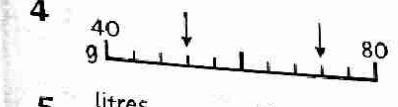
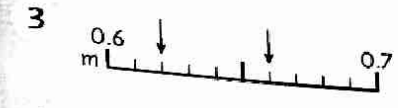
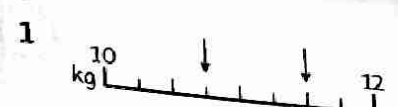
For each of the scales work out

- the measurement indicated by each of the arrows.
- the difference between the two arrows.

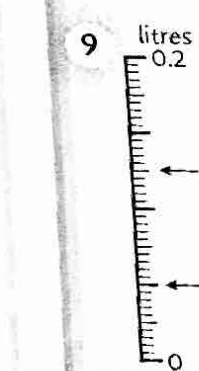
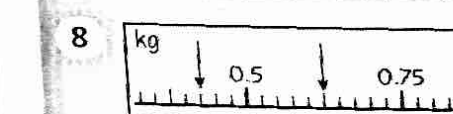
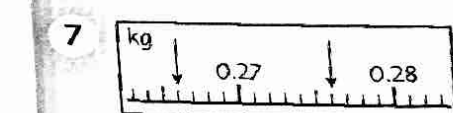
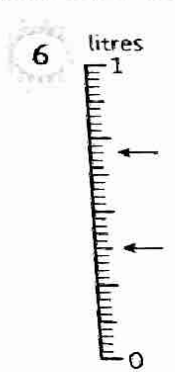
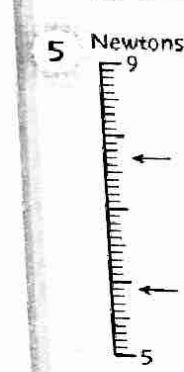
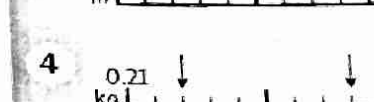
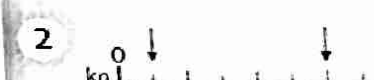
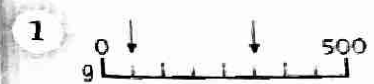
## A



## B



## C



On this page you will learn to use the metric measures of mass, grams, kilograms and tonnes.

1000 g = 1 kg      1000 kg = 1 tonne (t)

### A

Copy and complete by writing the missing number in the box.

- 1 4 kg =  g
- 2 2.5 kg =  g
- 3 3.4 kg =  g
- 4 0.17 kg =  g
- 5 3100 g =  kg
- 6 2250 g =  kg
- 7 300 g =  kg
- 8 5740 g =  kg
- 9 1.75 kg =  g
- 10 5.92 kg =  g
- 11 8000 g =  kg
- 12 1600 g =  kg

Write down which metric unit you would use to measure the mass of:

- 13 a bus
- 14 an ear ring
- 15 a jumbo jet
- 16 a slice of bread
- 17 a sack of coal
- 18 a teacher.



### B

Copy and complete by writing the missing number in the box.

- 1 1.3 kg =  g
- 2 4.25 kg =  g
- 3 6.148 kg =  g
- 4 3.7 kg =  g
- 5 1593 g =  kg
- 6 800 g =  kg
- 7 2760 g =  kg
- 8 25 g =  kg
- 9 2 t =  kg
- 10 1.64 t =  kg
- 11 1150 kg =  t
- 12 290 kg =  t

Write down which metric unit you would use to measure the mass of:

- 13 a sparrow



- 14 a dining table
- 15 a bowl of fruit
- 16 an elephant
- 17 a lorry
- 18 a CD
- 19 a bed
- 20 a pear.

### C

Copy and complete the tables.

g	kg
2486 →	
5 →	
120 →	
600 →	
	→ 3.475
	→ 0.025
	→ 1.84

2

kg	t
176 →	
1008 →	
17 →	
3200 →	
	→ 4.7
	→ 1.983
	→ 0.007

Copy and complete each sentence by choosing the best estimate.

- 3 A paperback book has a mass of about (0.001 kg, 0.01 kg, 0.1 kg).



- 4 Many ice hockey players weigh about (0.1 t, 0.01 t, 0.001 t).
- 5 A radio cassette player weighs about (30 g, 300 g, 3000 g).
- 6 Marsha is 10. She has a mass of about (0.4 kg, 4 kg, 40 kg).
- 7 A shoe has a mass of about (0.03 kg, 0.3 kg, 3 kg).
- 8 A small car has a mass of about (1t, 10t, 100t).



# MASS PROBLEMS

On this page you will learn to solve problems involving weight.

79

**A**  
**1** The mean weight of the 12 apples in a bag is 150 g. What is the total weight of apples in kilograms?

**2** Six identical eggs weigh 0.48 kg altogether. How much does each egg weigh in grams?

**3** Samson lifts 0.31 t. Hercules lifts 43 kg less. How much does Hercules lift in kilograms?



**4** An orange weighs 200 g. How much do 15 oranges weigh in kilograms?

**5** A box of 50 chocolate bars weighs 10 kg. How much does each chocolate bar weigh in grams?

**6** A bar of soap weighs 0.2 kg. 120 g are used. How much soap is left?

**B**  
**1** 150 Oxo cubes weigh 0.9 kg. What does one Oxo cube weigh in grams?

**2** Mrs. Gregg receives two parcels. One weighs 380 g. The other is twice as heavy. What is their combined weight in kilograms?

**3** A loaf of bread weighs one kilogram. It contains 25 slices. What does each slice weigh in grams?

**4** A shelf has 46 paperback books, each weighing 200 g. How much weight is the shelf supporting?

**5** 4 identical containers are loaded onto a lorry. Their combined weight is 2.74 t. What is the weight of each container in kilograms?

**6** A ship has 4.2 tonnes of cargo in the hold. 1368 kg is removed. How much cargo is left?



**C**  
**1** The total weight of a rugby team is 1.35 t. What is the mean weight of the 15 players in the team?

**2** A Weetabix weighs 25 g. A large box contains 72 biscuits. How much does the box weigh in kilograms?

**3** A dinosaur was concerned about his weight of 52.4 tonnes. He began to work out at the Jurassic Gym. Three months later he had lost 2763 kg. What did he weigh now?



**4** A plane weighs 60.87 tonnes. 1 679 kg of cargo is loaded. How much does the plane weigh now?

**5** Each tea bag contains 2.5 g of tea. How many tea bags can be made from 4 kg of tea?

**6** The mean weight of the 196 passengers on a plane is 68 kg. What is their total weight in tonnes?

On this page you will learn to use the metric measures of capacity, litres, centilitres and millilitres.

$$10 \text{ ml} = 1 \text{ cl} \quad 1000 \text{ ml} = 100 \text{ cl} = 1 \text{ litre}$$

**A**

Copy and complete by writing the missing number in the box.

- 1 7 litres =  ml
- 2 3.681 litres =  ml
- 3 2.930 litres =  ml
- 4 0.500 litres =  ml
- 5 1800 ml =  litres
- 6 750 ml =  litres
- 7 3100 ml =  litres
- 8 600 ml =  litres
- 9 6.5 litres =  ml
- 10 1.8 litres =  ml
- 11 2250 ml =  litres
- 12 480 ml =  litres

Write down which metric unit you would use to measure the capacity of:

- 13 a watering can



- 14 a beer barrel
- 15 a medicine bottle
- 16 a teardrop
- 17 a can of cola
- 18 a toilet cistern.

**B**

Copy and complete by writing the missing number in the box.

- 1 1.25 litres =  ml
- 2 0.7 litres =  ml
- 3 4.58 litres =  ml
- 4 2.9 litres =  ml
- 5 1470 ml =  litres
- 6 680 ml =  litres
- 7 2300 ml =  litres
- 8 9070 ml =  litres

- 9 70 cl =  litres
- 10 0.5 litres =  cl
- 11 15 cl =  ml
- 12 200 ml =  cl

Write down which metric unit you would use to measure the capacity of:

- 13 a syringe



- 14 an orange carton
- 15 a horse trough
- 16 a can of bicycle oil
- 17 an eyedrop
- 18 a jacuzzi
- 19 a sack of compost
- 20 a champagne bottle.

**C**

Copy and complete the table.

1	ml	cl	litres
	1284	→	→
	317	→	→
	6200	→	→
	5	→	→
	→	149	→
	→	70	→
	→	8	→
	→	200	→
	→	→	0.26
	→	→	3.7
	→	→	1.918
	→	→	0.004

Copy and complete each sentence by choosing the best estimate.

- 2 An ink cartridge contains (2 cl, 20 cl, 200 cl) of ink.
- 3 A tablespoon has a capacity of (0.001 l, 0.01 l, 0.1 l).
- 4 A vase has a capacity of (6 ml, 60 ml, 600 ml).
- 5 A glass can hold (30 ml, 300 ml, 3000 ml) of drink.
- 6 A cereal bowl has a capacity of (45 cl, 450 cl, 4500 cl).
- 7 A bucket has a capacity of (0.05 l, 0.5 l, 5 l).
- 8 An ice cream scoop has a capacity of (8 ml, 8 cl, 8 l).

# CAPACITY PROBLEMS

On this page you will learn to solve problems involving capacity.

**A**  
**1** A bottle of medicine contains 0.15 l. Paige takes 20 ml every day. How many bottles will she need in June?

**2** A fish bowl contains 4.2 litres of water. 360 ml is spilt. How much water does the bowl hold now?



**3** A sachet of shampoo contains 250 ml. There are twelve sachets in a box. How many litres of shampoo are there in the box?

**4** A test tube holds 0.1 litres of a liquid. 38 ml is added. How much liquid is there in the test tube?

**5** 26 ml of cycle oil is used from a 200 ml can. A further 47 ml is used. How much oil is left?

**6** How many 80 ml scoops of ice cream can be taken from a 2 litre tub?

**B**  
**1** Eight 350 ml beakers are filled from a full 4.5 litre flask of tea. How much tea is left in the flask?

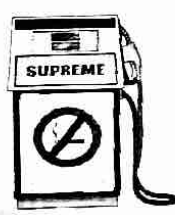
**2** A paddling pool contains 66.3 litres of water. 60 cl evaporates. How much water is left?

**3** Darren fills a bath with 22.6 litres of hot water and 8.7 litres of cold water. He spills 4 cl getting in. How much water is left in the bath?

**4** How many 20 cl cartons of milk can be filled from a 10 litre churn?

**5** There are 12 bottles of wine in a box. Each bottle contains 70 cl. How much wine is there altogether in litres?

**6** A petrol pump delivers 400 ml of petrol every second. How much petrol will it deliver in one minute?



**C**  
**1** A punch bowl contains 1.7 litres of drink. 70 cl of lemonade is added. The drink is shared among eight people. How much do they each have in millilitres?

**2** A chemist makes 60 l of perfume. How many 150 ml bottles can be filled with the perfume?

**3** A fireman's hose uses 80 cl of water every second. How many litres of water does it use in 5 minutes?



**4** A horse trough holds 12.34 litres of water. Dobbie drinks 70 cl. Beauty drinks 875 ml. How much water is left?

**5** A saucepan contains 1.6 l of boiling water. 137 ml evaporates before 25 cl is added. How much water is there now in the saucepan?

**6** A bottle of soy sauce contains 150 ml. How much soy sauce is needed to fill 48 bottles. Give your answer in litres.

On this page you will learn to use the relationship between metric and imperial units.

### THE METRIC MEASURES

The metric system of measures was invented in France in the C18th. All the units in the metric system are in tens, hundreds or thousands.

### THE IMPERIAL SYSTEM

The imperial system of measures developed in Britain. Towards the end of the C20th it was officially replaced by the metric system, which is easier to use. However, many imperial measures are still in common use.

This table shows the most commonly used imperial units for length, mass and capacity, and their metric equivalents. (The sign " $\approx$ " means "is approximately equal to".)

#### LENGTH

- 1 inch  $\approx$  2.5 cm
- 1 foot  $\approx$  30 cm
- 1 yard  $\approx$  90 cm
- 1 mile  $\approx$  1.6 km
- 8 km  $\approx$  5 miles

#### MASS

- 1 ounce  $\approx$  30 g
- 1 kg  $\approx$  2.2 pounds

#### CAPACITY

- 1 pint  $\approx$  0.6 litres
- 1 gallon  $\approx$  4.5 litres

### A

Copy and complete

- 1 2 inches  $\approx$   cm
- 2 3 feet  $\approx$   cm
- 3 5 ounces  $\approx$   g
- 4 10 pints  $\approx$   litres
- 5 2 gallons  $\approx$   litres
- 6 10 miles  $\approx$   km
- 7 2 yards  $\approx$   cm
- 8 6.6 pounds  $\approx$   kg
- 9 15 cm  $\approx$   inches
- 10 45 litres  $\approx$   gallons
- 11 40 km  $\approx$   miles
- 12 9 m  $\approx$   yards
- 13 10 kg  $\approx$   pounds
- 14 1 m 50 cm  $\approx$   feet
- 15 2.4 litres  $\approx$   pints
- 16 240 g  $\approx$   ounces

State which imperial unit you would use to measure the following.

Lengths

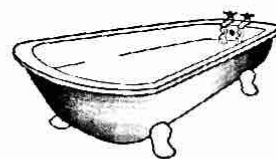
- |                    |                |
|--------------------|----------------|
| 17 a motorway      | 19 a finger    |
| 18 a cricket pitch | 20 a chair leg |

Masses

- |                 |                   |
|-----------------|-------------------|
| 21 eight apples | 23 a bag of sugar |
| 22 an egg       | 24 a CD           |

Capacities

- |                    |                      |
|--------------------|----------------------|
| 25 a jug           | 27 a washing up bowl |
| 26 a swimming pool | 28 a bath            |



8 Copy and complete by putting  $>$  or  $<$  in the box.

- 1 15 pounds  6 kg
- 2 3 yards  3 m
- 3 6 feet  1 m 90 cm
- 4 6 miles  12 km
- 5 8 ounces  225 g
- 6 6 gallons  25 litres
- 7 8 yards  7 m
- 8 9 feet  2 m 60 cm
- 9 12 pounds  5 kg
- 10 9 gallons  42 litres
- 11 12 ounces  370 g
- 12 11 miles  20 km
- 13 5 pints  2.5 litres
- 14 4 inches  11 cm
- 15 8 pints  4 litres
- 16 100 yards  95 m

Copy and complete each sentence by choosing the best estimate.

- 17 A tin of beans has a mass of about (1 ounce, 11 ounces, 100 ounces).
- 18 A bed is about (4 feet, 6 feet, 8 feet) long.
- 19 A pen is about (6 inches, 9 inches, 12 inches) long.
- 20 The distance from London to Manchester is about (2 miles, 20 miles, 200 miles).
- 21 A can of cola holds about ( $\frac{1}{2}$  pint, 2 pints, 12 pints).
- 22 A football pitch is about (1 yard, 10 yards, 100 yards) long.
- 23 An egg has a mass of about ( $\frac{1}{2}$  ounce, 2 ounces, 12 ounces).
- 24 A car's petrol tank holds about (1 gallon, 10 gallons, 100 gallons).



9

Copy and complete by putting  $>$  or  $<$  in the box.

- 1 9 miles  14 km
- 2 17 ounces  0.5 kg
- 3 7 yards  6.5 m
- 4 8 gallons  35 litres
- 5 11 inches  29 cm
- 6 18 pounds  8 kg
- 7 12 miles  20 km
- 8 15 yards  14 m
- 9 14 feet  4.1 m
- 10 5 inches  12 cm
- 11 4 pints  2.2 litres
- 12 12 gallons  55 litres
- 13 12 feet  3.5 m
- 14 12 pints  7.5 litres
- 15 27 ounces  0.8 kg
- 16 80 miles  130 km

- 17 To the nearest litre, how many litres are there in:
 

a) 2 gallons	c) $1\frac{1}{2}$ gallons
b) $2\frac{1}{2}$ gallons	d) $3\frac{1}{2}$ gallons?



- 18 To the nearest tenth of a gallon, how many gallons are there in:
 

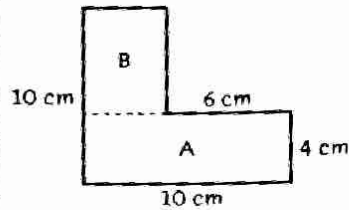
a) 9 litres	c) 14 litres
b) 5 litres	d) 18 litres?
- 19 To the nearest pound, how many pounds are there in:
 

a) 100 kg	c) 5 kg
b) 14 kg	d) 26 kg?
- 20 Rewrite the sentences in Section B, changing the chosen measurement to the approximate metric equivalent.

On these pages you will learn:

- to calculate the area and the perimeter of composite shapes that can be split into rectangles.

**Example**

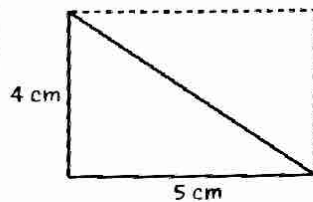


$$\begin{aligned} \text{Area of whole shape} &= \text{Area of A} + \text{Area of B} \\ &= (10 \times 4) \text{ cm}^2 + (6 \times 4) \text{ cm}^2 \\ &= 40 \text{ cm}^2 + 24 \text{ cm}^2 = 64 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Perimeter} &= 10 \text{ cm} + 10 \text{ cm} + 4 \text{ cm} + 6 \text{ cm} + 6 \text{ cm} + 4 \text{ cm} \\ &= 40 \text{ cm} \end{aligned}$$

- to calculate the area of a right-angled triangle.

**Example**



Think of the triangle as half of a rectangle.

$$\begin{aligned} \text{Area of rectangle} &= (5 \times 4) \text{ cm}^2 = 20 \text{ cm}^2 \\ \text{Area of triangle} &= 20 \text{ cm}^2 \div 2 = 10 \text{ cm}^2 \end{aligned}$$

**A**

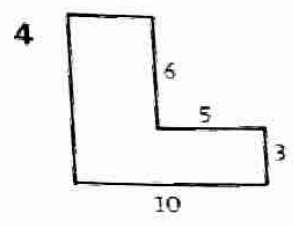
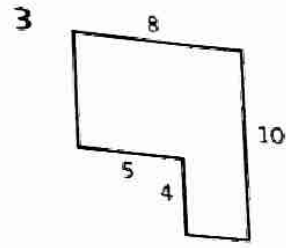
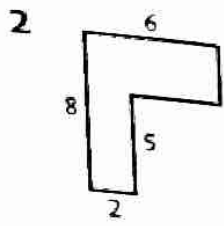
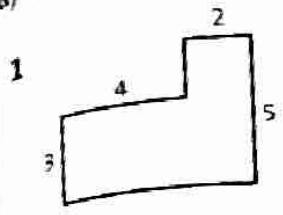
Work out the perimeters of each of these shapes.

- square sides 12 cm
- regular hexagon sides 5 cm
- regular octagon sides 7 cm
- equilateral triangle sides 15 cm
- Copy and complete this table showing the measurements of rectangles.

Length	9 cm	8 cm	6 cm	12 cm	6 cm	8 cm
Breadth	7 cm	3 cm				
Perimeter					26 cm	34 cm
Area			12 cm <sup>2</sup>	60 cm <sup>2</sup>		

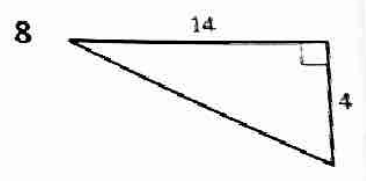
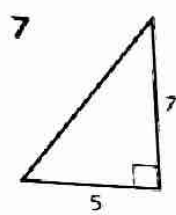
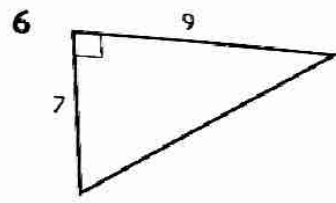
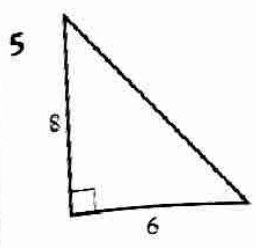
- A rectangular playground is 25 metres wide. It has an area of 1000 m<sup>2</sup>. How long is the playground?
- Use 1 cm<sup>2</sup> squared paper. Draw three different rectangles each with an area of 36 cm<sup>2</sup>. Work out the perimeters.
- Use 1 cm<sup>2</sup> squared paper. Draw three different rectangles each with a perimeter of 36 cm. Work out the areas.

The length of these shapes are in cm. For each shape work out:  
 a) the area      b) the perimeter.



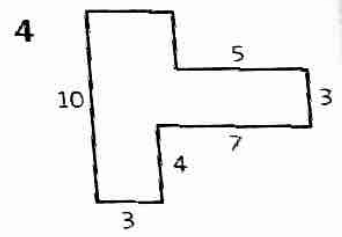
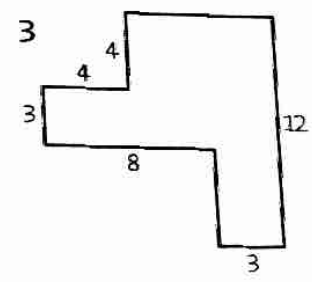
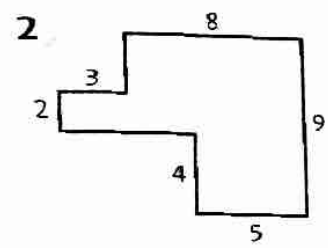
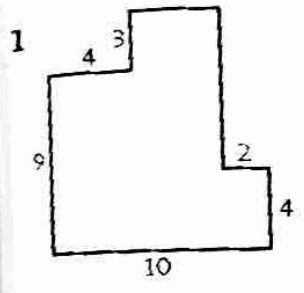
Use squared paper to draw the triangles.  
 For each triangle draw the other half of a rectangle.  
 Work out the area of:

a) each rectangle      b) each triangle

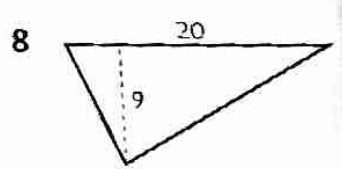
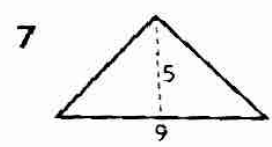
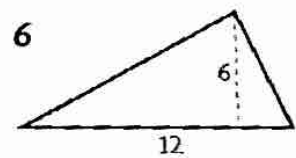
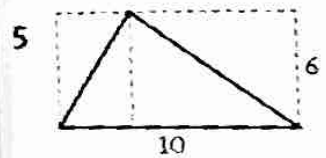


- 9 How many square millimetres are there in a square metre?  
 10 Use  $1\text{ cm}^2$  squared paper. Draw as many shapes with an area of  $2\text{ cm}^2$  as you can.

The lengths of these shapes are in cm. For each shape work out:  
 a) the area      b) the perimeter.



Work out the area of each triangle. All the lengths are in cm.



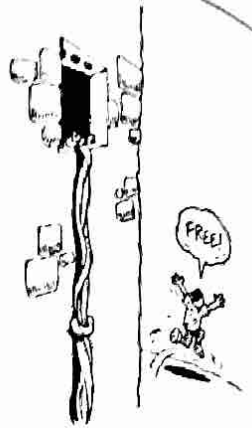
- 9 A room is 5 metres long by 3 metres wide. It costs £285 to carpet the room.  
 How much does the carpet cost per square metre?  
 10 Use  $1\text{ cm}^2$  squared paper. Draw as many shapes with an area of  $3\text{ cm}^2$  as you can.

On these pages you will learn to use the vocabulary related to time.

You should know and be able to use these facts and this rhyme.

1 millennium	=	1000 years
1 century	=	100 years
1 year	=	12 months
	=	52 weeks
1 week	=	7 days
1 day	=	24 hours
1 hour	=	60 minutes
1 minute	=	60 seconds

'30 days has September,  
April, June and November.  
All the rest have 31,  
Save for February alone,  
Which has but 28 days clear  
And 29 in each leap year.'



## A

Write as

minutes

weeks

years

- |                        |            |                |
|------------------------|------------|----------------|
| 1 7 hours              | 5 6 years  | 9 60 months    |
| 2 $3\frac{3}{4}$ hours | 6 21 days  | 10 13 weeks    |
| 3 360 seconds          | 7 140 days | 11 19 decades  |
| 4 75 seconds           | 8 20 years | 12 2 millennia |
- 13 What will be the date two weeks after:  
a) 24th June    b) 19th March    c) 27th May    d) 30th October?

Look at the calendar for August.

On what day of the week do these birthdays fall?

- 14 Andrea - August 8th
- 15 Joshua - August 19th
- 16 Vicky - July 26th
- 17 Tyrone - September 15th
- 18 On what day of the week is the 1st of September?  
Write out the calendar for September.

AUGUST						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

- 19 Gregory's birthday is three weeks after Christmas Day?  
What is the date of his birthday?
- 20 March 1st is a Wednesday. How many Saturdays are there in April?



B

Write as

minutes

- 1 14 hours
- 2 2 days
- 3 225 seconds
- 4  $\frac{1}{2}$  week

weeks

- 5 11 years
- 6 3 decades
- 7 112 days
- 8 840 hours

years

- 9  $37\frac{1}{2}$  decades
- 10  $3\frac{1}{4}$  millennia
- 11 416 weeks
- 12 66 months

- 13 What will be the date five weeks after:
- a) 6th May
  - b) 13th November
  - c) 28th June
  - d) 30th July?

Look at the calendar for December.

On what day of the week do these dates fall?

- 14 Epiphany - January 6th 2005
- 15 Remembrance Day - November 11th 2004
- 16 Hallowe'en - October 31st 2004
- 17 St. Valentine's Day - February 14th 2005
- 18 Write out the calendar for March 2005.

DECEMBER 2004						
Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

C

- 1 Write True or False for each of the following statements.
- a) 40 years is longer than 15 000 days.
  - b) There are less than 1000 hours in 6 weeks.
  - c) Five hours is less than 20 000 seconds.
  - d) One million minutes is more than two years.
  - e) There are never enough minutes in a day.



- 2 What will be the date five weeks before:
- a) 12th March 2008
  - b) 24th October
  - c) 6th June
  - d) 1st December?

Look at the calendar for April 2005.

On what day of the week do these dates fall?

- 3 St. Patrick's Day - March 17th
- 4 The longest day - June 21st
- 5 New Year's Day - January 1st, 2005
- 6 Christmas Day - December 25th
- 7 Write out the calendar for April 2006.

APRIL 2005						
Su	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

On this page you will learn to understand different times around the world.

Because the Earth rotates on its axis once every 24 hours, times are different around the world. The table shows the differences between the time in London (Greenwich Mean Time) and the times in other cities around the world.

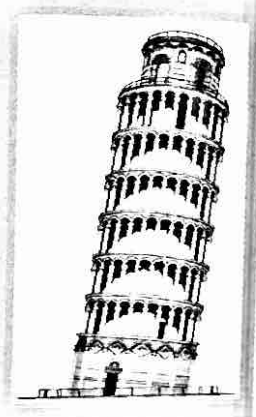
City	Time Difference	City	Time Difference
Rome	+1	Jerusalem	+2
New York	-5	Buenos Aires	-3
Karachi	+5	Hong Kong	+8
Mexico City	-6	Los Angeles	-8
Tokyo	+9	Sydney	+10

**A** What time is it in each of the cities in the table if it is 12:00 (noon) in London?

**B** Write down the time in each of the cities in the table if the time in London is:  
a) 04:00      b) 22:00.

- C**
- 1 An international company is based in London. It needs to contact its Head Offices in each of the cities in the above table when it is 09:00 in that city. At what time would each telephone call need to be made from London?
  - 2 Copy and complete the table showing arrival and departure times of international airline flights from London.

Depart	Flight (Hours)	Arrive	Local Time
16:00	2	Rome	
15:00	6	New York	
18:00	8	Karachi	
09:00	11	Mexico City	
17:00	13	Tokyo	
	4	Jerusalem	16:00
	13	Buenos Aires	15:00
	14	Hong Kong	10:00
	12	Los Angeles	18:00
	23	Sydney	08:00



# TIME PROBLEMS

On this page you will learn to solve problems involving time.

- A**
- 1 Reece started painting his room at 08:30. He finished at 15:10.  
For how long was he painting?
  - 2 A boat left Portsmouth at 14:40. It arrived at Cherbourg at 22:20.  
How long did the voyage take?
  - 3 The concert began at 19:45. It lasted for 2 hours 40 minutes.  
At what time did it end?
  - 4 An athlete began running a marathon at 10:15. He finished the race at 13:50.  
For how long was he running?
  - 5 Jason slept for eight and a half hours. He woke up at 07:10.  
At what time did he go to sleep?

**B**

Lamb must be cooked for 30 minutes for every pound.  
Write down how long the meat needs to be cooked if it weighs:

1 3 lb

2 2 lb

3 2.5 lb

4 5.5 lb.

- 5 Copy and complete the table showing cooking times for lamb.

Weight	Start	Finish
3 lb	11:00	
4.5 lb	15:30	
2.5 lb	12:50	
3.5 lb	16:40	



**C**

Chicken must be cooked for 20 minutes and then 40 minutes for every kilogram.  
Write down how long a chicken needs to be cooked if it weighs:

1 2.5 kg

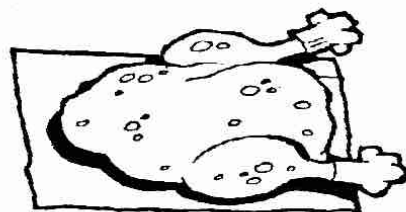
2 3.5 kg

3 1.25 kg

4 2.75 kg.

- 5 Copy and complete the table showing cooking times for chicken.

Weight	Start	Finish
1.5 kg	11:45	
2.25 kg	15:35	
1.75 kg		12:30
3.25 kg		18:30

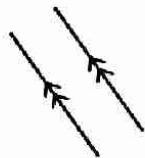


On these pages you will learn:

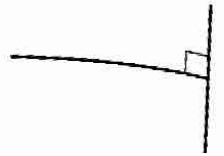
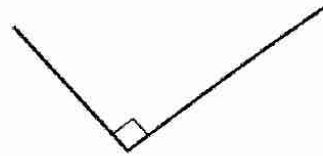
- to recognise parallel and perpendicular lines.

Parallel lines are lines that are the same distance apart for all their length.

Railway lines are parallel lines.

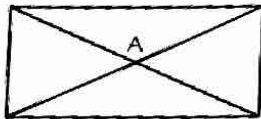


Perpendicular lines cross or meet at right angles.



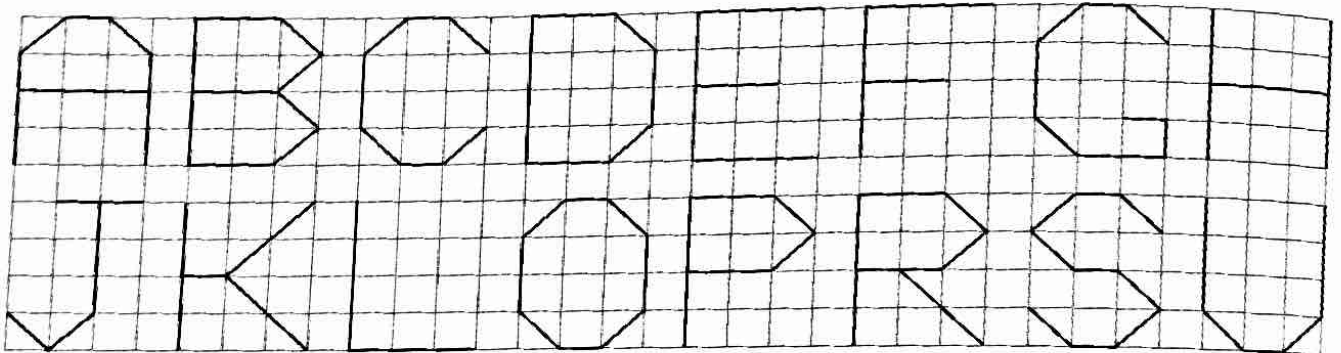
- to recognise intersecting lines and intersections.

Two lines that cross each other are called intersecting lines. The point at which they cross is an intersection.

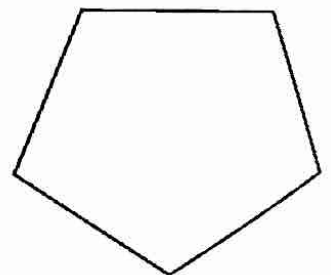


Point A is the intersection of the diagonals of the rectangle.

**A**

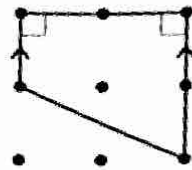


- 1 Use squared paper. Copy each of the letters above in a  $3 \times 4$  grid. Show all the parallel lines with arrows or coloured pens or pencils, using a different colour for each pair of parallel lines in a letter. Show all the perpendicular lines by marking right angles.
- 2 Draw round a regular pentagon template (or trace the diagram). Draw on all the diagonals. How many intersections are there?
- 3 Investigate the diagonals of irregular pentagons. Do you always get the same number of intersections?

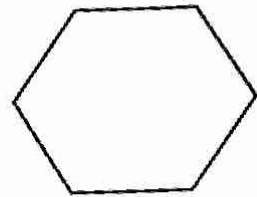


- B**
- 1 This quadrilateral has one pair of parallel lines and two pairs of perpendicular lines.

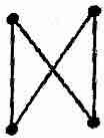
Use  $3 \times 3$  grids on squared or dotted paper.  
Find as many different quadrilaterals as you can.  
Show all the parallel lines with arrows and show all the perpendicular lines by marking a right angle.



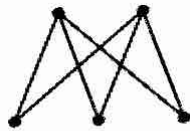
- 2 Draw round a regular hexagon template (or trace the diagram).  
Draw on all the diagonals. How many intersections are there?
- 3 Investigate the diagonals of irregular hexagons.  
Do you get the same result?



- C**
- 1 If you join 2 points to 2 points  
you get one intersection.



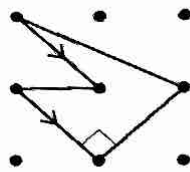
If you join 2 points to 3 points  
you get three intersections.



Investigate joining 2 points to 2, 3, 4, 5, etc. points. Record your results in a table.  
Use it to predict how many intersections you would get if you joined 2 points to 12 points.

- 2 This pentagon has been drawn in a  $3 \times 3$  grid. It has one pair of parallel lines and one pair of perpendicular lines.

Use  $3 \times 3$  grids on squared or dotted paper.  
Find as many different polygons with more than four sides as you can.  
Identify all the parallel lines with arrows and show all the perpendicular lines by marking a right angle.



Can you find shapes with:

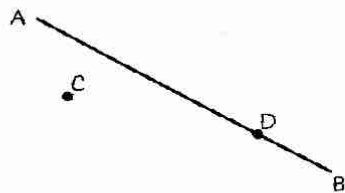
- a) 0    b) 1    c) 2    d) 3 pairs of parallel lines?

Can you find shapes with:

- a) 0    b) 1    c) 2    d) 3    e) 4    f) 5    g) 6 perpendicular lines?

- 3 Copy the diagram.

- a) Draw a line through C which is perpendicular to AB.  
b) Draw a line through D which is perpendicular to AB.  
c) Draw a line through C which is parallel to AB.

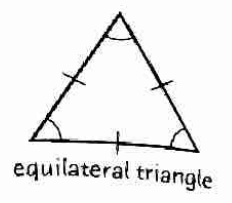
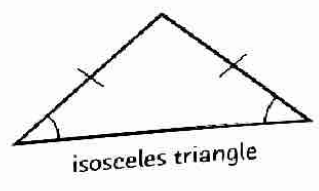
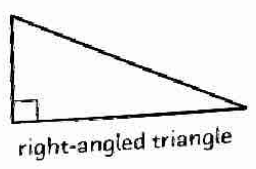
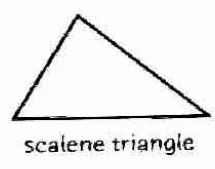


On these pages you will learn to classify 2-D shapes.

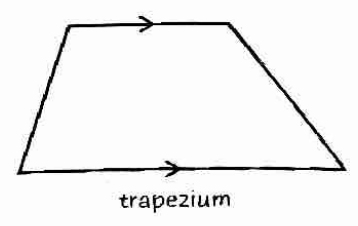
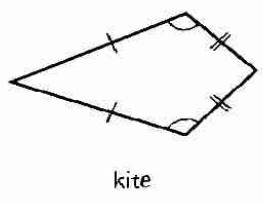
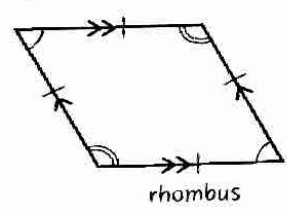
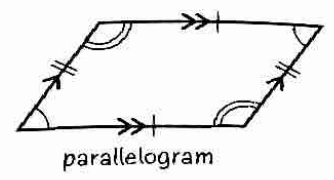
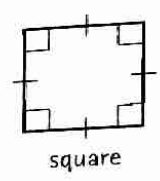
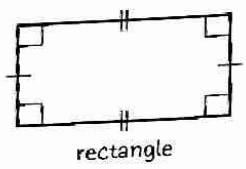
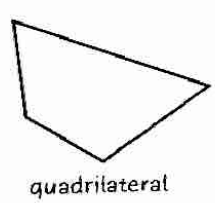
2-D shapes with straight lines are called *polygons*.  
In the examples:

- equal lines are shown with dashes.
- equal angles are marked.
- parallel lines are shown with arrows.

A three sided polygon is a *triangle*.



A four-sided polygon is a *quadrilateral*.



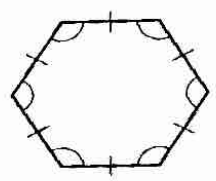
**OTHER POLYGONS**

5 sides - pentagon  
6 sides - hexagon

7 sides - heptagon  
8 sides - octagon

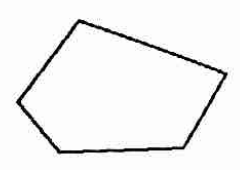
**REGULAR POLYGONS**

All sides and all angles are equal.

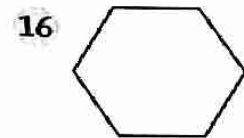
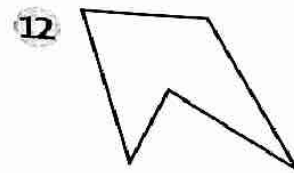
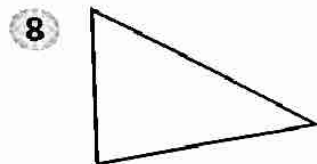
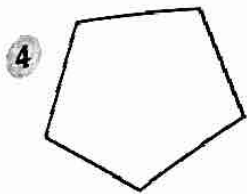
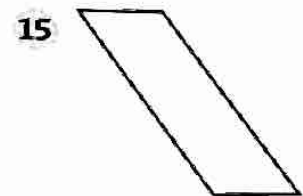
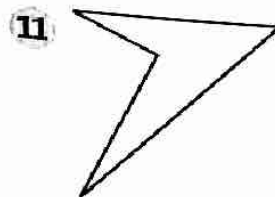
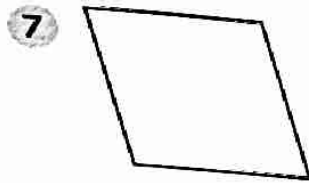
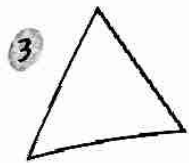
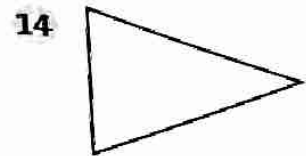
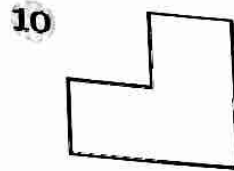
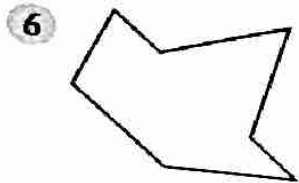
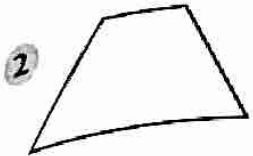
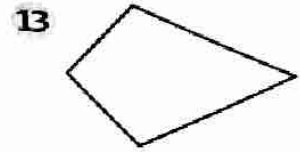
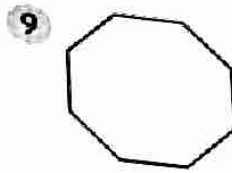
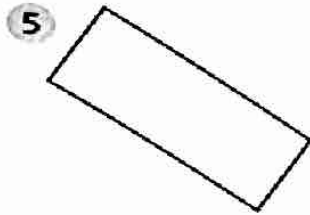
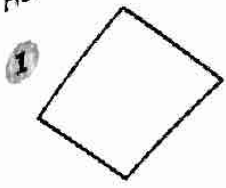


**IRREGULAR POLYGONS**

Sides and angles are not all equal.



Here are some shapes.



**A** Write the name of each of the above shapes (e.g. irregular hexagon, trapezium, etc.).

**B** Look at the quadrilaterals on page 92. Write down which of the quadrilaterals have:

- |                        |                              |                          |
|------------------------|------------------------------|--------------------------|
| 1 4 equal sides        | 5 equal adjacent sides       | 9 4 equal angles         |
| 2 2 equal sides        | 6 2 pairs of parallel lines  | 10 2 equal angles        |
| 3 0 equal sides        | 7 1 pair of parallel lines   | 11 equal opposite angles |
| 4 equal opposite sides | 8 no pairs of parallel lines | 12 equal adjacent angles |

**C** Investigate the diagonals of the different types of quadrilateral shown on page 92. State which of the quadrilaterals have:

- 1 diagonals that are equal.
- 2 diagonals that intersect (cross) at right angles.
- 3 diagonals that bisect one another (cut each other in half).

On these pages you will learn to use co-ordinates to find the position of a point beyond the first quadrant.

The position of a point on a grid is given by its x and y co-ordinates.

### Examples

The position of point A.

x co-ordinate is  $-2$ .

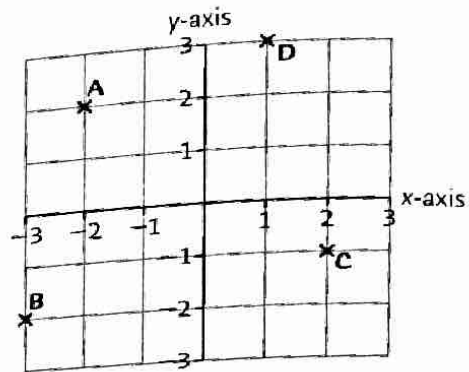
y co-ordinate is  $2$ .

Point A is  $(-2, 2)$ .

Point B is  $(-3, -2)$ .

Point C is  $(2, -1)$ .

Point D is  $(1, 3)$ .



Remember: The x co-ordinate always comes first.

## A

- 1 Use the grid to work out this word.  
 $(4, 5)$   $(2, 2)$   $(4, 4)$   $(2, 1)$   $(2, 1)$   $(0, 1)$

- 2 Use the grid to write the name of your school in co-ordinates.

- 3 Write your name in co-ordinates.

- 4 Use the grid to work out the joke written in co-ordinates. Work across.

$(0, 5)$   $(4, 4)$   $(5, 3)$   $(3, 2)$   $(3, 3)$   $(4, 5)$

$(5, 4)$   $(2, 5)$   $(0, 1)$   $(0, 1)$   $(2, 1)$   $(0, 5)$   $(5, 3)$   $(4, 2)$   $(1, 0)$

$(5, 2)$   $(2, 1)$   $(2, 1)$   $(1, 0)$   $(5, 3)$   $(3, 2)$   $(5, 5)$   $(5, 3)$   $(3, 2)$   $(4, 4)$   $(4, 5)?$

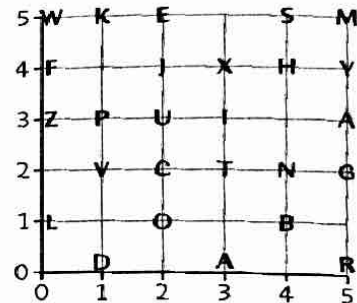
$(5, 3)$   $(4, 1)$   $(5, 3)$   $(4, 2)$   $(5, 3)$   $(4, 2)$   $(5, 3)$   $(0, 5)$   $(3, 3)$   $(3, 2)$   $(4, 4)$

$(5, 3)$   $(2, 2)$   $(5, 3)$   $(0, 1)$   $(2, 2)$   $(2, 3)$   $(0, 1)$   $(5, 3)$   $(3, 2)$   $(2, 1)$   $(5, 0)$ .

- 5 Draw a  $10 \times 4$  grid. (0-10 along the x-axis, 0-4 along the y-axis). Plot the co-ordinates and join them up in the order given to create a picture.

$(0, 3)$   $(1, 3)$   $(3, 4)$   $(7, 3)$   $(10, 4)$   $(8, 2)$   $(10, 0)$   $(7, 1)$   $(4, 0)$   $(3, 0)$   $(0, 1)$   $(1, 2)$   $(0, 3)$

- 6 Use the grid above to write your own joke in co-ordinates.

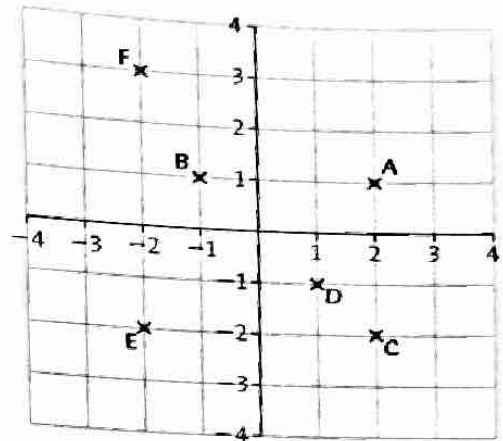




**B**  
1 Write down the co-ordinates of the letters.

2 Find the missing co-ordinates needed to complete these shapes.

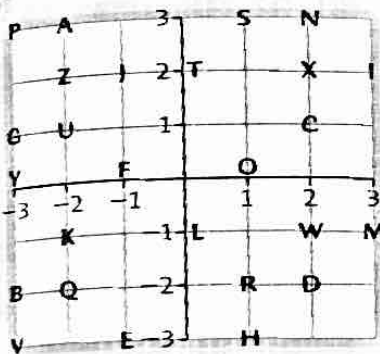
- a) ABC and (□, □) is a square.
- b) ADC and (□, □) is a kite.
- c) CEF and (□, □) is a rectangle.
- d) CDE and (□, □) is a parallelogram.



3 Draw a grid like the one above. Plot the points for shape A. Join them up in the order given. Use a different colour for each shape. Name the shapes.

A	B	C	D
(2, 1)	(-3, -2)	(-4, -3)	(1, 2)
(2, 4)	(2, -2)	(-1, 3)	(-2, 2)
(-3, 4)	(-2, 1)	(2, -3)	(-2, -1)
(-3, 1)	(-3, 1)		(1, -1)

**C**  
1 Use the grid to work out the joke written in co-ordinates.



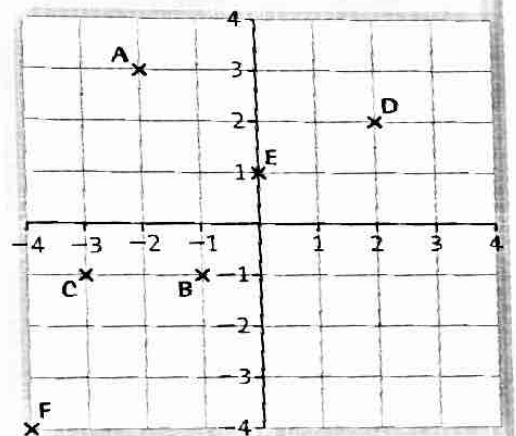
(2, -1) (1, -3) (-2, 3) (0, 2) (3, 2) (1, 3)  
 (-3, 0) (-1, -3) (0, -1) (0, -1) (1, 0) (2, -1) (-2, 3) (2, 3) (2, -2)  
 (-1, -3) (2, 2) (0, 2) (1, -2) (-1, -3) (3, -1) (-1, -3) (0, -1) (-3, 0)  
 (2, -2) (-2, 3) (2, 3) (-3, 1) (-1, -3) (1, -2) (1, 0) (-2, 1) (1, 3)?  
 (1, 3) (1, -3) (-2, 3) (1, -2) (-2, -1)  
 (3, 2) (2, 3) (-1, 0) (-1, -3) (1, 3) (0, 2) (-1, -3) (2, -2)  
 (2, 1) (-2, 1) (1, 3) (0, 2) (-2, 3) (1, -2) (2, -2)

2 Write down the co-ordinates of the six letters in the second grid

3 Find the missing co-ordinates to complete these shapes.

- a) ACD and (□, □) is a square.
- b) FAD and (□, □) is a kite.
- c) BED and (□, □) is a rhombus.
- d) ADE and (□, □) is a parallelogram.

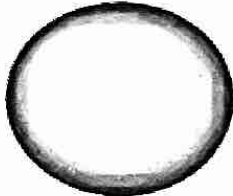
There are 3 possible answers to d).  
Can you find them all?



4 Use the grid in question 1 to write your own joke in co-ordinates.

On these pages you will learn to classify 3-D shapes according to their properties.

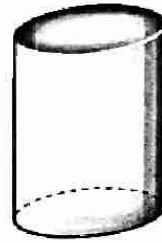
Some 3-D shapes with curved edges.



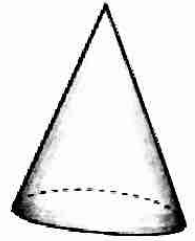
sphere



hemi-sphere

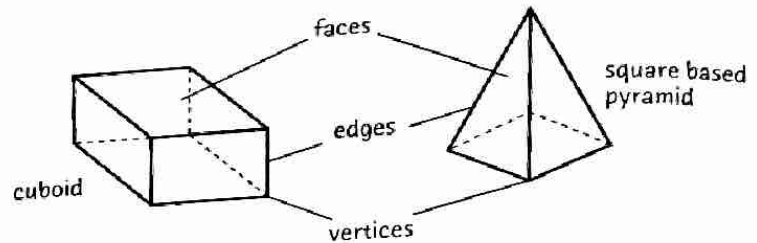


cylinder

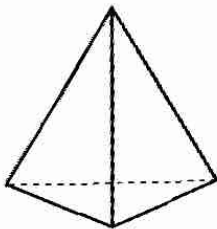


cone

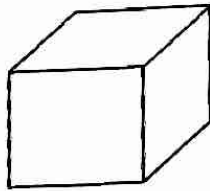
A 3-D shape with straight edges is called a polyhedron.



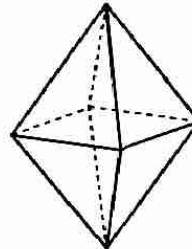
Regular polyhedra have faces which are identical.



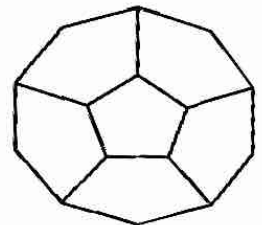
tetrahedron



cube

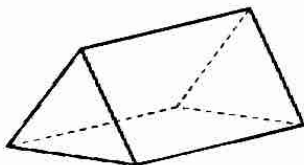


octahedron

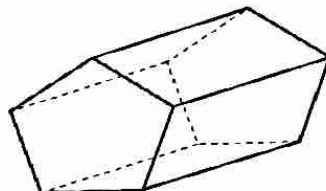


dodecahedron

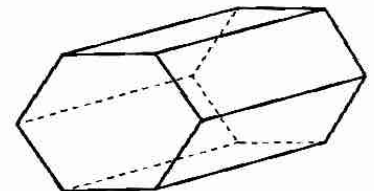
A *prism* is a polyhedron with two identical end faces and the same cross section throughout its length.



triangular based prism

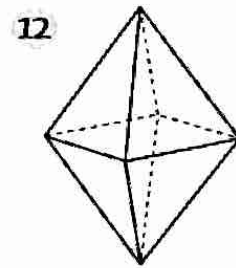
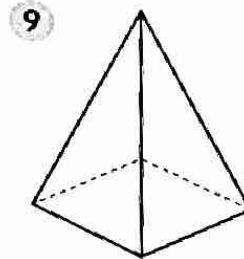
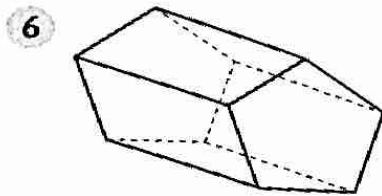
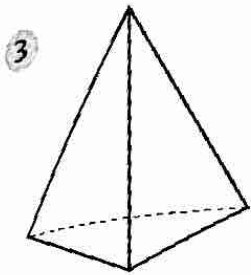
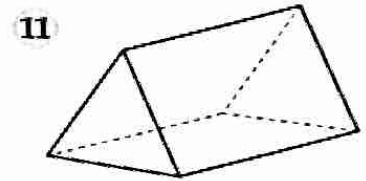
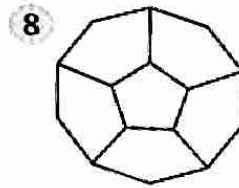
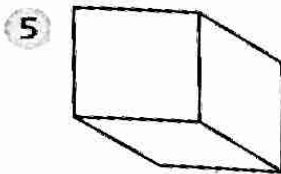
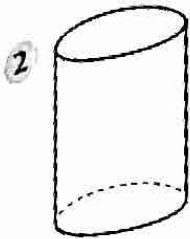
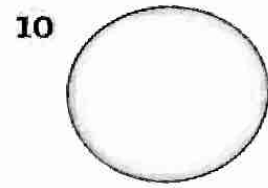
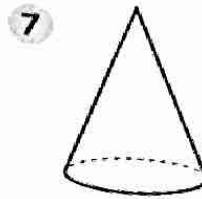
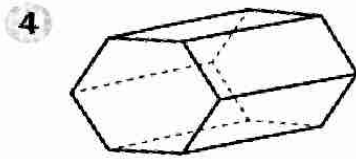
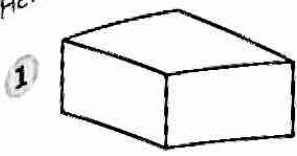


pentagonal based prism



hexagonal based prism

Here are some shapes.



**A** Copy and complete the table for each of the shapes.

No.	Shape	Faces	Edges	Vertices
1	cuboid	6	12	8

**B**

Describe the flat faces for each of the shapes.

**Example**

1 The cuboid has 6 rectangles.

**C**

For each of the polyhedra and prisms above, write down:

- the name of the shape.
- the number of faces which have right angles.
- the number of pairs of parallel faces.
- whether any of the faces are perpendicular.
- whether the number of edges meeting at each vertex is the same or different.

98  
On this page you will investigate different ways of making polygons.

**A**  
Investigate the 2-D shapes you can make using a  $3 \times 3$  grid on a pinboard or on squared or dotted paper. (A  $3 \times 3$  grid has 4 small squares.)

How many different ways can you make a square, a parallelogram, a trapezium, etc?

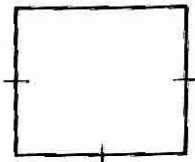
Can you make symmetrical polygons?

What is the largest number of sides a shape can have?

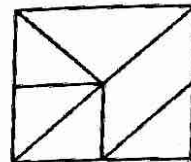
**B**

Use a large square piece of card.

Mark the mid points of 3 sides



Draw these lines and then cut out the shapes.



Investigate the 2-D shapes you can make using different combinations of the card shapes.

How many different triangles, quadrilaterals, etc. can you make using all 6 pieces?

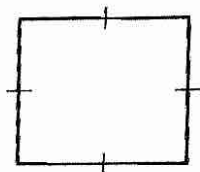
Can you make identical shapes using different combinations of some or all of the pieces?

Ask your own questions.

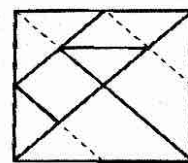
**C**

Use a large square piece of card.

Mark the mid points of each side.



Use the mid points to draw these lines. Cut out the shapes.



[The dotted lines are guide lines only.]

Investigate the different 2-D shapes you can make using different combinations of the card shapes.

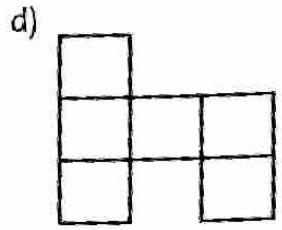
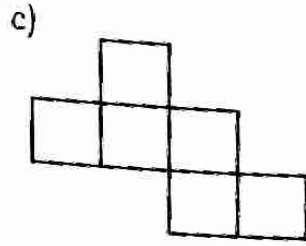
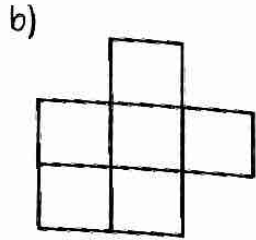
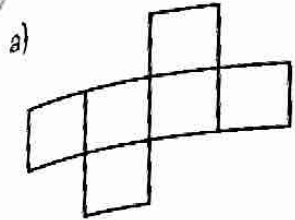
Can you make a square with 2, 3, 4, 5, 6 pieces?

What shapes can you make using all the pieces?

Ask your own questions and investigate.

On this page you will learn to make nets for 3-D shapes.

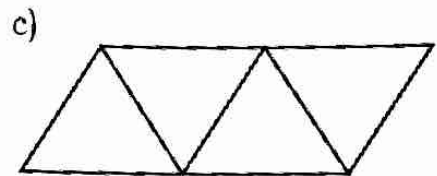
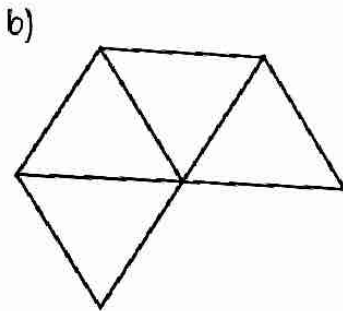
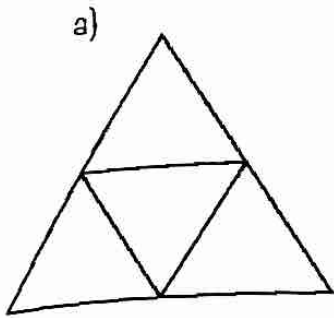
**A** 1 Which of these nets will make a closed cube?



2 Copy the nets onto squared paper. Cut them out and see if you were right.

3 There are 11 different nets for a closed cube. Can you find them all?

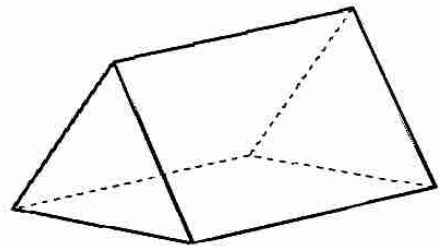
**B** 1 Which of these nets will make a tetrahedron?



2 Copy the nets onto triangle dotted paper. Cut them out and see if you were right.

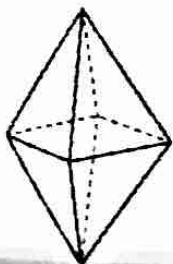
3 Use triangle dotted paper again.

Can you make a net for a triangular based prism?

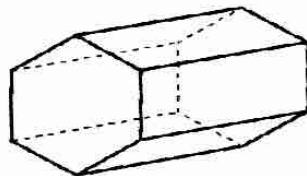


**C** Use triangle dotted paper. Make nets for:

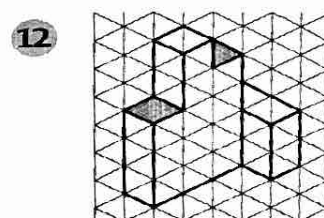
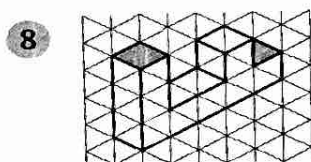
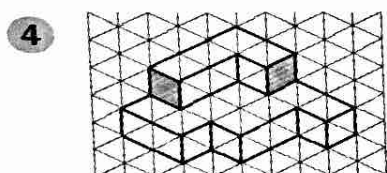
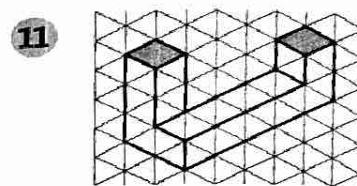
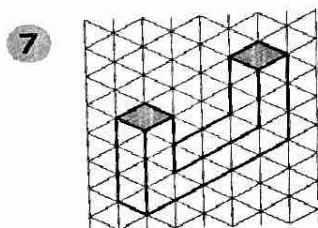
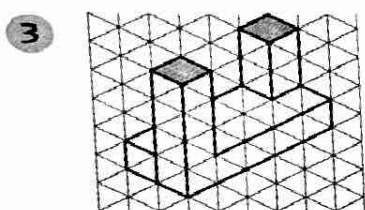
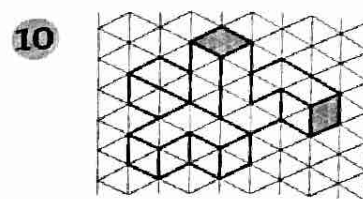
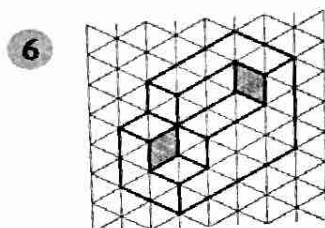
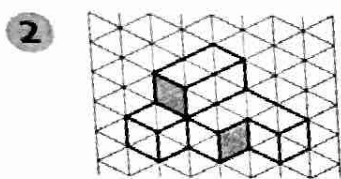
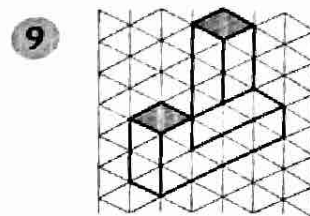
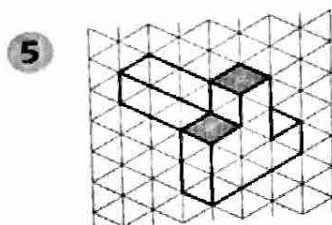
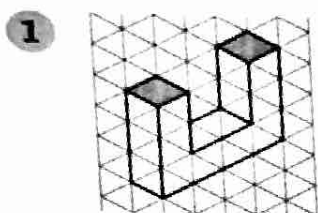
1 an octahedron



2 an hexagonal based prism.



On this page you will learn to visualise 3-D shapes from 2-D drawings.



### A

How many cubes are needed to build these shapes?

### B

For shape 1 you need four cubes to cover and join the two shaded faces.

Work out how many cubes you need to cover and join the shaded faces in shapes 2 to 12.

### C

1 Use triangle dotty paper. Copy the drawings.

2 Make 3-D shapes of your own using 5 cubes. Draw the shapes on triangle dotty paper.

# TRANSLATIONS

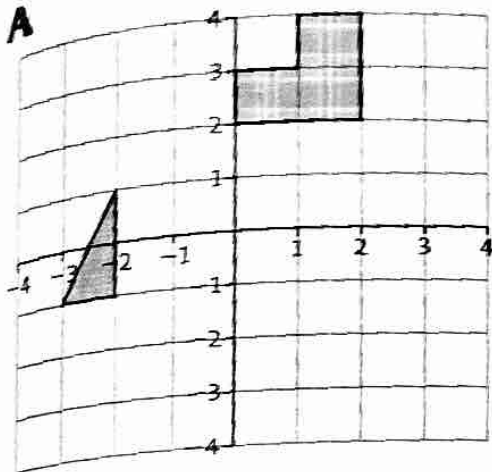
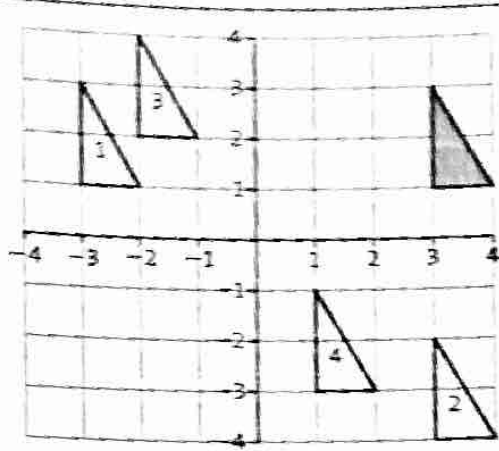
On this page you will learn to sketch the pattern of a shape after it has been translated.

Translating a shape means moving it in a straight line.

### Example

Translate the shaded shape:

- 1 left 6 squares (L6)
- 2 down 5 squares (D5)
- 3 left 5 squares, up 1 square (L5 U1)
- 4 left 2 squares, down 4 squares (L2, D4).



- 1 Copy the grid and the hexagon. Translate the shape three times.  
a) R2    b) L3    c) D3
- 2 Copy the grid and the triangle. Translate the triangle three times.  
a) U2    b) R4    c) L1

- B**
- 1 Copy the grid and the hexagon in Section A. Translate the shape three times.  
a) L4 D2    b) L1 D3    c) R2 D1

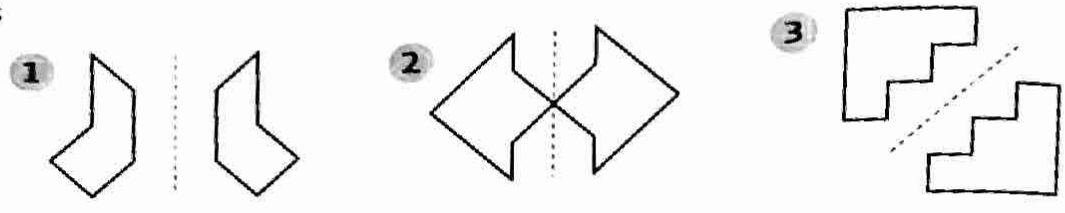
- 2 Copy the grid and the triangle in Section A. Translate the triangle three times.  
a) L1 U2    b) R3 D1    c) R4 U2

**C**  
Plot the following triangles on grids like those above. Sketch the positions after each of the translations.

- |                          |                            |                             |
|--------------------------|----------------------------|-----------------------------|
| 1 (1, 1), (1, 3), (2, 1) | 2 (-2, 1), (-1, 3), (0, 1) | 3 (1, -1), (2, -2), (0, -3) |
| a) R2 D3                 | a) R3 U1                   | a) R1 U4                    |
| b) L3 U1                 | b) L1 D4                   | b) L3 D1                    |
| c) L4 D3                 | c) R4 D3                   | c) L2 U5                    |

On this page you will learn to sketch the reflection of a shape in a mirror line.

### Examples

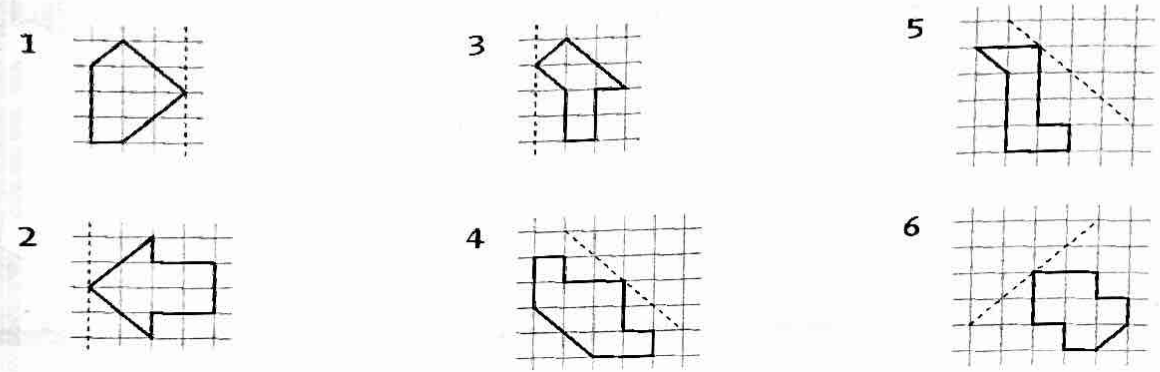


In each of the problems copy the shape and the mirror line and sketch the reflection.

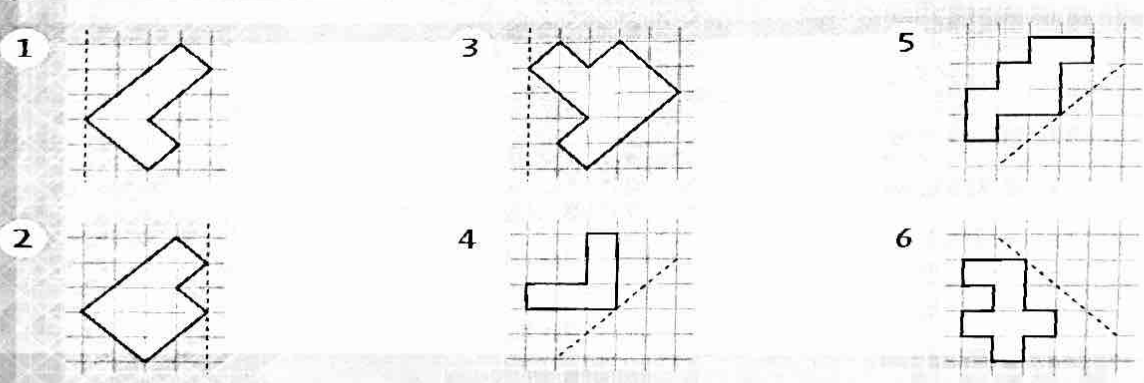
### A



### B



### C



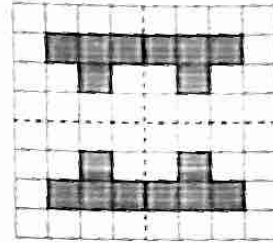
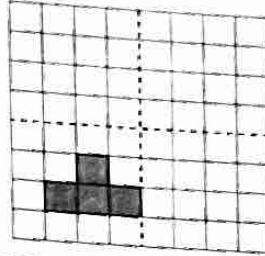
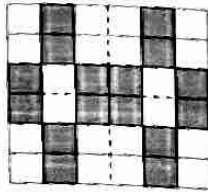
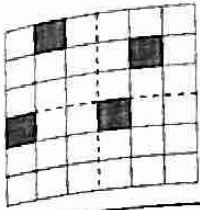


# SYMMETRICAL PATTERNS

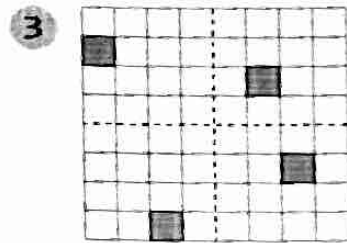
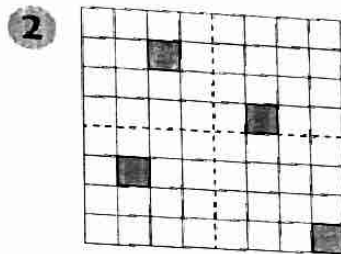
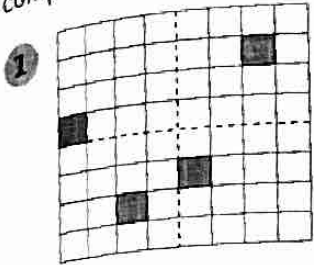
On this page you will learn to complete a symmetrical pattern and to sketch the reflection of a simple shape in two mirror lines.

## Examples

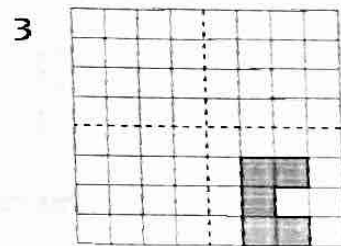
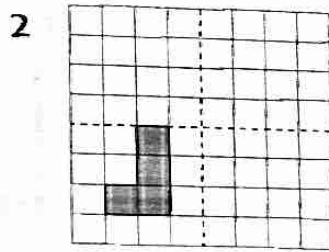
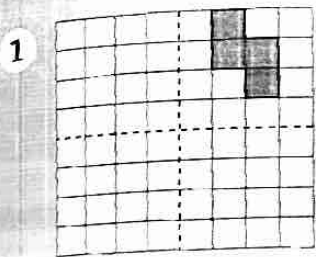
Sketch the reflections of the shaded squares in both mirror lines.



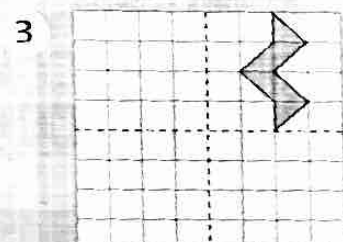
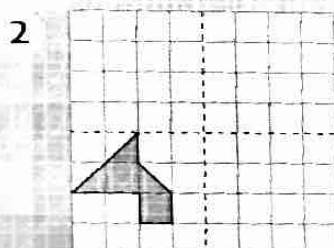
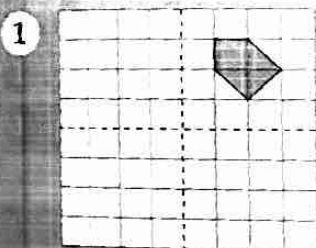
**A** Copy each of the patterns onto squared paper. Shade in as many squares as necessary to complete the symmetrical patterns, as in the  $6 \times 6$  grids above.



**B** Copy each of the squares below onto squared paper. Sketch the reflections of the shapes in both mirror lines.



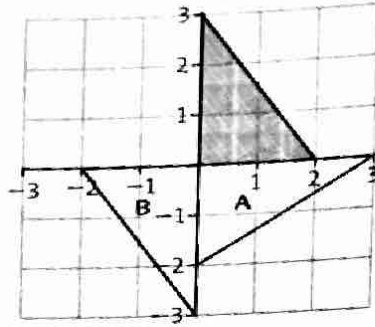
**C** Copy each of the squares below onto squared paper. Sketch the reflections of the shapes in both mirror lines.



On this page you will learn to sketch the position of a shape after a rotation.

**Example**

- A:  $90^\circ$  rotation about  $(0, 0)$
- B:  $180^\circ$  rotation about  $(0, 0)$



**USEFUL TIPS**

- 1 Imagine holding the point of rotation down with a pencil point.
- 2  $90^\circ$  rotation - horizontal lines become vertical and vice versa.
- 3  $180^\circ$  rotation - horizontal and vertical remain unchanged.
- 4 Use tracing paper.

**A**

Use squared paper. You can use tracing paper. For each of the following shapes:

- a) copy the shape.
- b) rotate the shape  $90^\circ$  about point A in a clockwise direction.
- c) rotate the shape  $180^\circ$  about point A.



**B**

Copy the following shapes on grids showing all four quadrants, as in the example above. Rotate each shape both  $90^\circ$  and  $180^\circ$  about the origin,  $(0, 0)$ , in a clockwise direction.



**C**

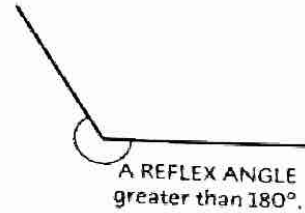
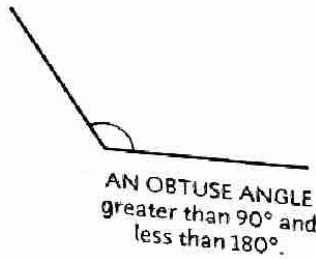
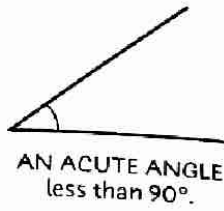
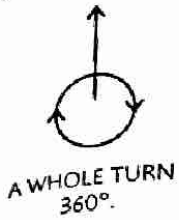
Join up the following points in the order given on grids showing all four quadrants, as in the example above. Rotate each shape about the origin, using the angle given.

- 1  $(0, 0)$   $(0, 3)$   $(3, 1)$   $(0, 0)$   $90^\circ$  clockwise
- 2  $(0, 0)$   $(-2, 1)$   $(-3, 3)$   $(-1, 2)$   $(0, 0)$   $180^\circ$
- 3  $(0, 0)$   $(-1, -2)$   $(-3, -2)$   $(-2, 0)$   $(0, 0)$   $270^\circ$  clockwise
- 4  $(0, 0)$   $(3, -3)$   $(1, -3)$   $(0, 0)$   $90^\circ$  anticlockwise

# ANGLES

On these pages you will learn to estimate, measure and draw angles accurately.

Angles measure the amount something turns or rotates. Angles are measured in degrees ( $^{\circ}$ ).

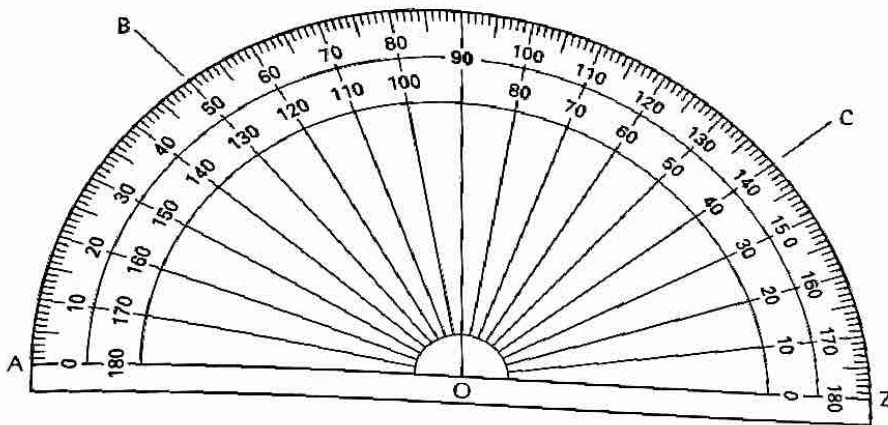


## USING A PROTRACTOR

A protractor is used to measure or draw angles accurately. Most protractors have two scales, a clockwise outer scale and an anti-clockwise inner scale. It is important to use the correct scale.

### Examples

Outer Scale  
 $\widehat{AOB} = 50^{\circ}$   
 $\widehat{AOC} = 140^{\circ}$

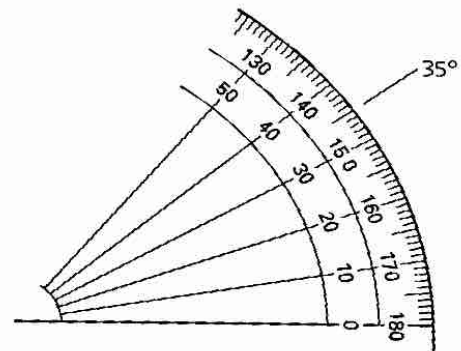


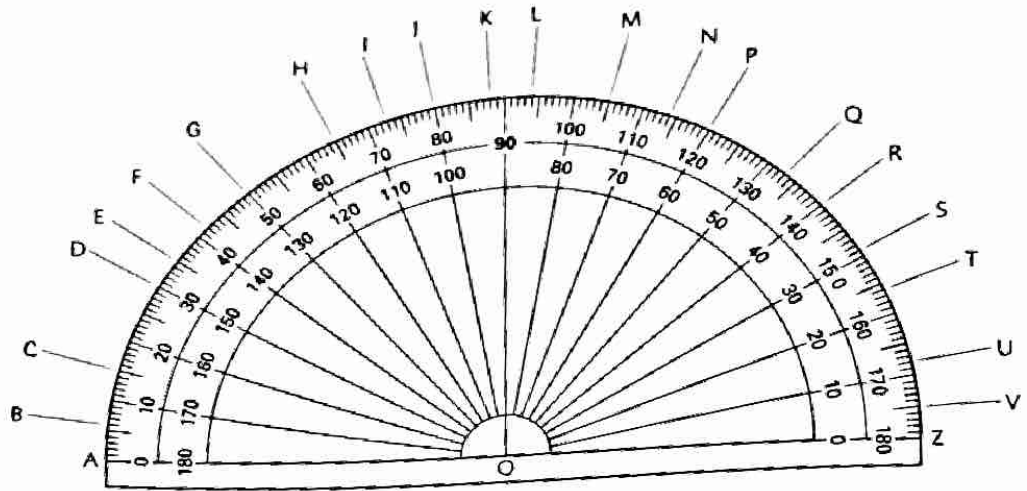
Inner Scale  
 $\widehat{ZOC} = 40^{\circ}$   
 $\widehat{ZOB} = 130^{\circ}$

$360^{\circ}$  protractors are easier to use when measuring reflex angles, but  $180^{\circ}$  protractors can be used to measure the inner angle made by the two lines, so that the reflex angle can be calculated. In the example of a reflex angle shown above, the inner angle is  $120^{\circ}$ . Therefore the reflex angle is  $240^{\circ}$ , because  $360^{\circ} - 120^{\circ} = 240^{\circ}$ .

### COMMON MISTAKES

- 1 Using the wrong scale.  
 Before measuring, decide if the angle is acute, obtuse or reflex. The angle in the example is  $35^{\circ}$  but could be read wrongly as  $145^{\circ}$ .
- 2 Reading the scale in the wrong direction.  
 Make sure you look at the numbers on both sides of the line being measured. The angle in the example could be read wrongly as  $45^{\circ}$ .





**A**

Use the above protractor.

Give the measurement of each angle.

- |                   |                   |                    |
|-------------------|-------------------|--------------------|
| 1 $\widehat{AOE}$ | 5 $\widehat{AOH}$ | 9 $\widehat{ZOR}$  |
| 2 $\widehat{AOI}$ | 6 $\widehat{AOV}$ | 10 $\widehat{ZOC}$ |
| 3 $\widehat{AOR}$ | 7 $\widehat{ZOM}$ | 11 $\widehat{ZOP}$ |
| 4 $\widehat{AOC}$ | 8 $\widehat{ZOI}$ | 12 $\widehat{ZOE}$ |

Draw the following angles.

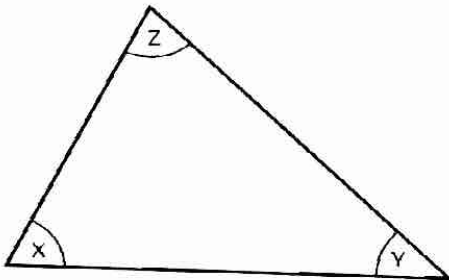
Label each angle acute or obtuse.

- |                |               |                |
|----------------|---------------|----------------|
| 13 $55^\circ$  | 15 $15^\circ$ | 17 $75^\circ$  |
| 14 $140^\circ$ | 16 $95^\circ$ | 18 $155^\circ$ |

Measure these angles on the diagram on the opposite page.

- |                    |                    |                    |
|--------------------|--------------------|--------------------|
| 19 $\widehat{AOC}$ | 22 $\widehat{ZOI}$ | 25 $\widehat{AOI}$ |
| 20 $\widehat{AOK}$ | 23 $\widehat{ZOF}$ | 26 $\widehat{ZOM}$ |
| 21 $\widehat{AOG}$ | 24 $\widehat{ZON}$ | 27 $\widehat{ZOB}$ |

28 Measure these angles.



**B**

Use the above protractor.

Give the measurement of each angle.

- |                   |                   |                    |
|-------------------|-------------------|--------------------|
| 1 $\widehat{AOK}$ | 5 $\widehat{AOD}$ | 9 $\widehat{AOG}$  |
| 2 $\widehat{ZOL}$ | 6 $\widehat{ZOS}$ | 10 $\widehat{ZON}$ |
| 3 $\widehat{AOU}$ | 7 $\widehat{AOQ}$ | 11 $\widehat{AOT}$ |
| 4 $\widehat{ZOF}$ | 8 $\widehat{ZOB}$ | 12 $\widehat{ZOI}$ |

Draw the following angles.

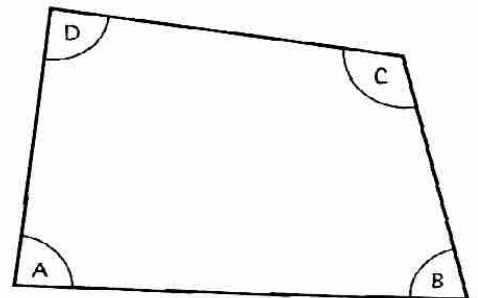
Label each angle acute, obtuse or reflex.

- |                |               |                |
|----------------|---------------|----------------|
| 13 $62^\circ$  | 15 $18^\circ$ | 17 $240^\circ$ |
| 14 $173^\circ$ | 16 $91^\circ$ | 18 $156^\circ$ |

Measure these angles on the diagram on the opposite page.

- |                    |                    |                    |
|--------------------|--------------------|--------------------|
| 19 $\widehat{ZOL}$ | 22 $\widehat{AOD}$ | 25 $\widehat{ZOH}$ |
| 20 $\widehat{AOH}$ | 23 $\widehat{ZOE}$ | 26 $\widehat{ZOD}$ |
| 21 $\widehat{ZOC}$ | 24 $\widehat{AOB}$ | 27 $\widehat{AOE}$ |

28 Measure these angles.



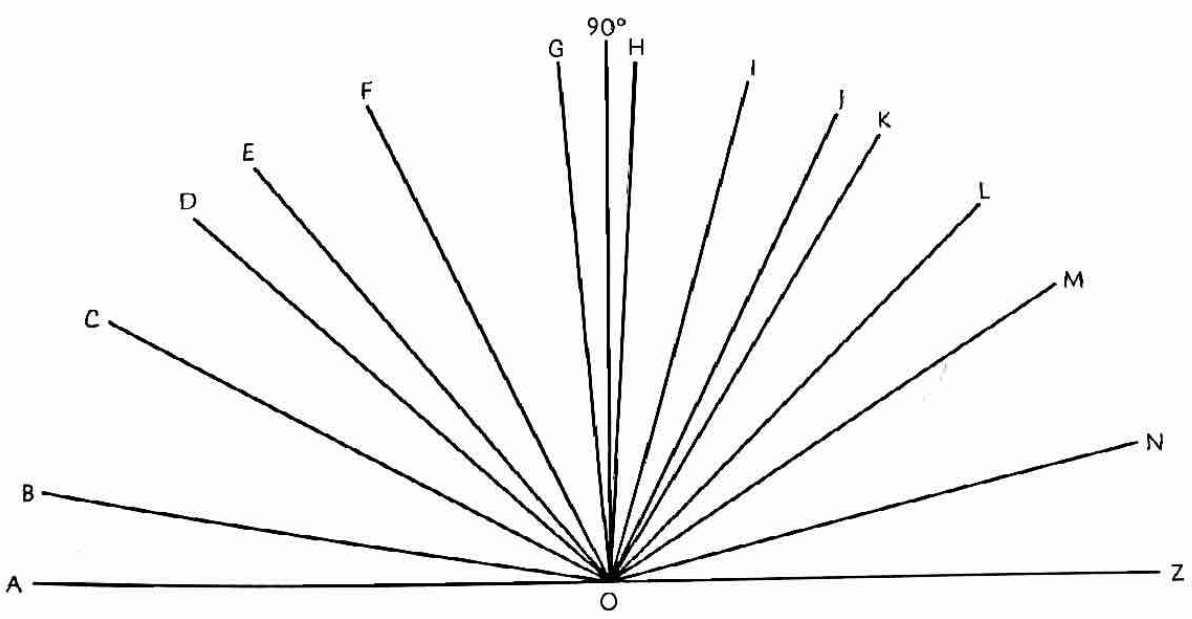
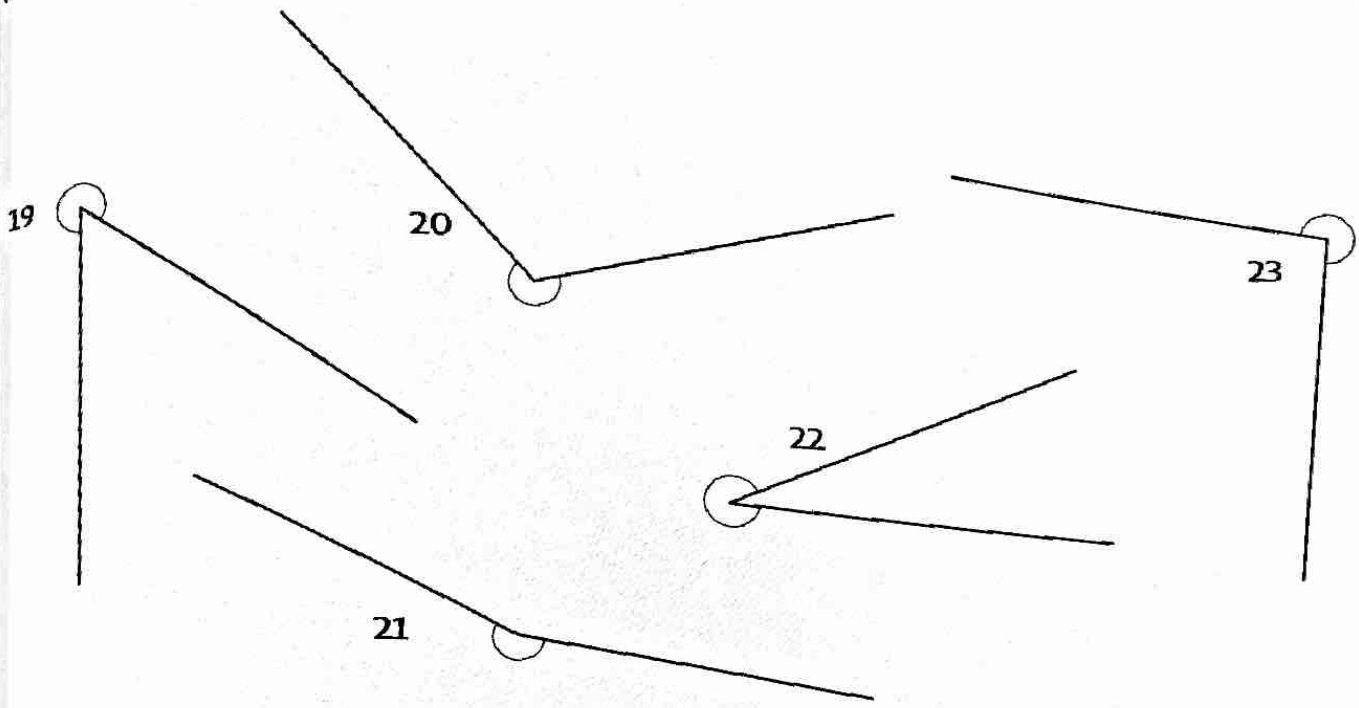
Give the measurement of these angles on the protractor on the opposite page.

- |               |               |               |               |                |                |
|---------------|---------------|---------------|---------------|----------------|----------------|
| 1 $\hat{AOL}$ | 3 $\hat{AOF}$ | 5 $\hat{ZOU}$ | 7 $\hat{AOB}$ | 9 $\hat{AOM}$  | 11 $\hat{AOI}$ |
| 2 $\hat{ZOK}$ | 4 $\hat{AOS}$ | 6 $\hat{ZOQ}$ | 8 $\hat{ZOT}$ | 10 $\hat{ZOG}$ | 12 $\hat{ZOD}$ |

Draw the following angles. Label each angle acute, obtuse or reflex.

- |                |              |                |               |                |                |
|----------------|--------------|----------------|---------------|----------------|----------------|
| 13 $137^\circ$ | 14 $6^\circ$ | 15 $235^\circ$ | 16 $89^\circ$ | 17 $190^\circ$ | 18 $345^\circ$ |
|----------------|--------------|----------------|---------------|----------------|----------------|

Measure the following reflex angles.



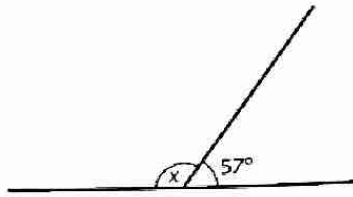
This diagram is used for questions 19 to 27 in Sections A and B on page 106.

On these pages you will learn to calculate angles on a straight line, at a point and in a triangle.

### Examples

#### • ANGLES ON A STRAIGHT LINE

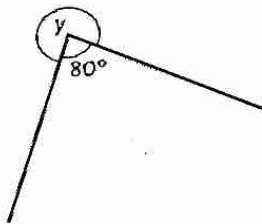
The sum of the angles on a straight line is  $180^\circ$ .



$$\begin{aligned}x + 57^\circ &= 180^\circ \\x &= 123^\circ\end{aligned}$$

#### • ANGLES AT A POINT

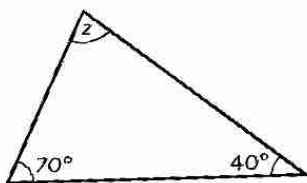
A whole turn is  $360^\circ$ .



$$\begin{aligned}y + 80^\circ &= 360^\circ \\y &= 280^\circ\end{aligned}$$

#### • ANGLES IN A TRIANGLE

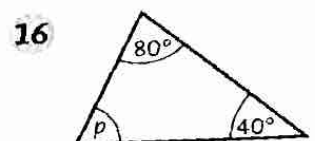
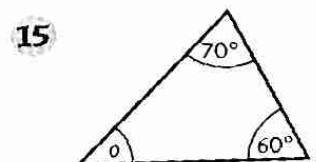
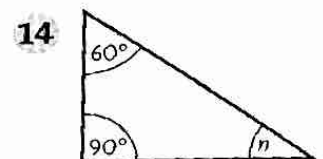
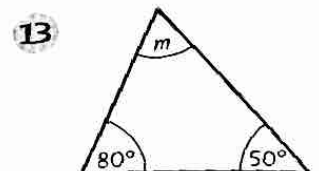
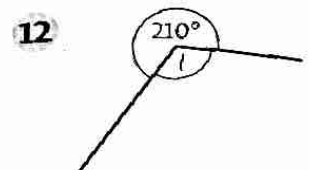
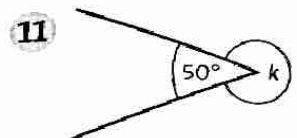
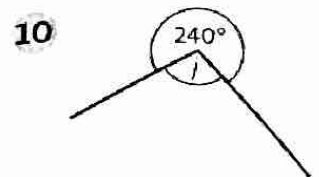
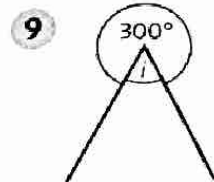
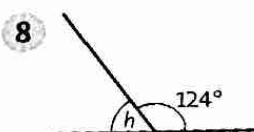
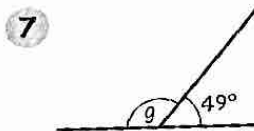
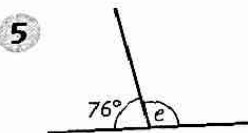
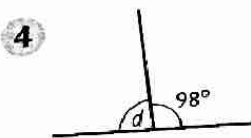
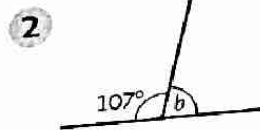
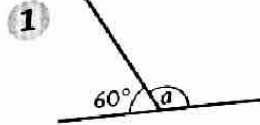
The sum of the angles in a triangle is  $180^\circ$ .



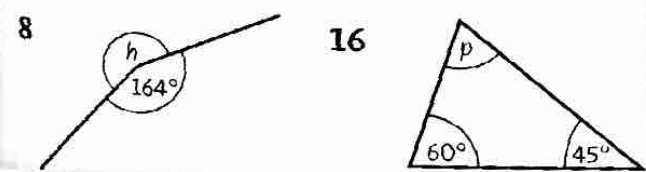
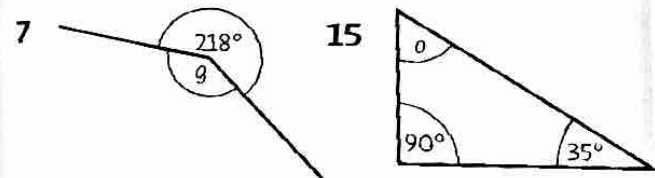
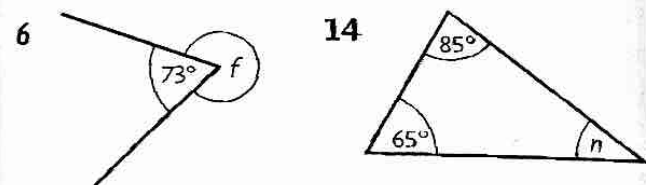
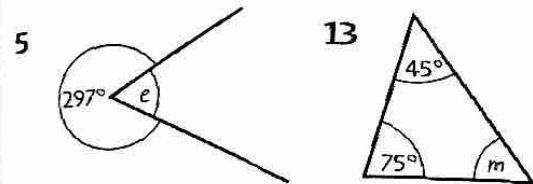
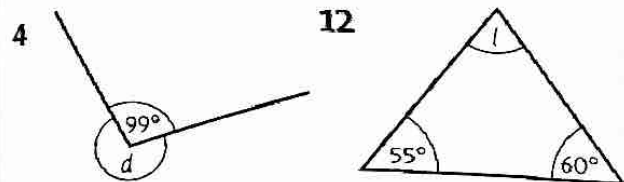
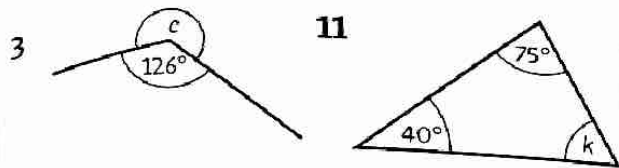
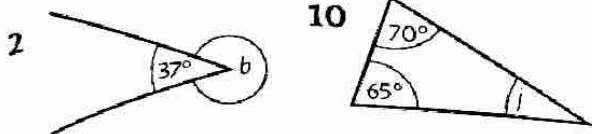
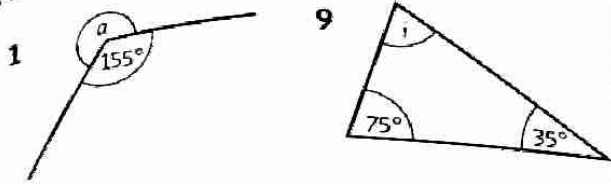
$$\begin{aligned}z + 110^\circ &= 180^\circ \\z &= 70^\circ\end{aligned}$$

### A

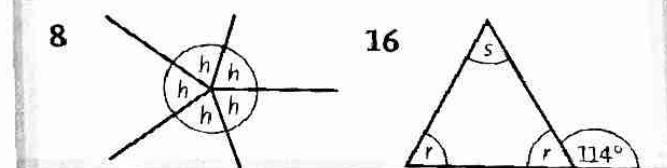
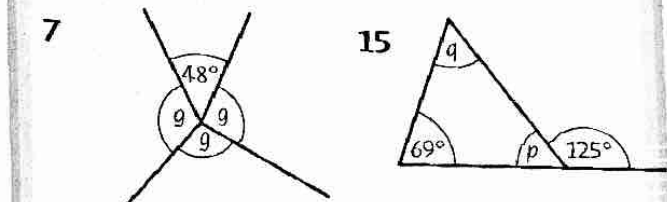
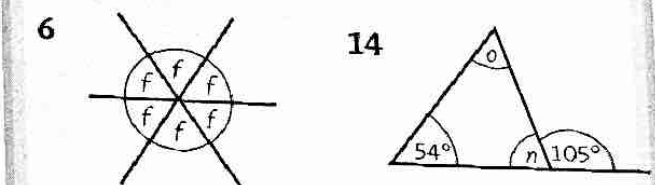
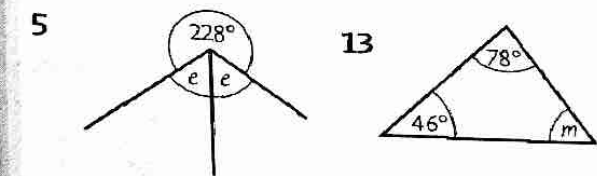
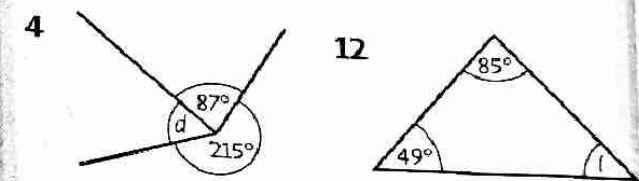
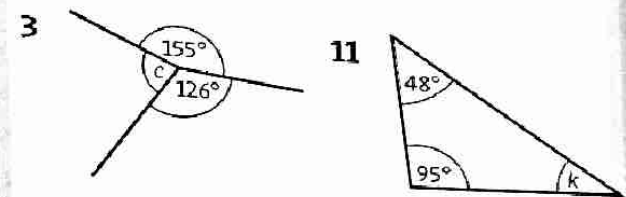
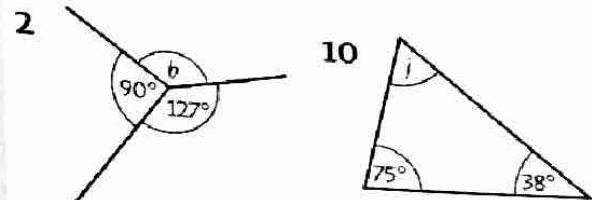
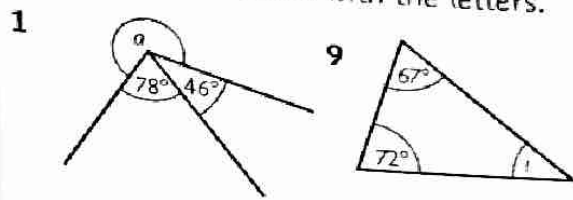
Find the angles marked with the letters.



**B** Find the angles marked with the letters.



**C** Find the angles marked with the letters.



On these pages you will learn to use the language associated with probability.

The probability of something happening is the likelihood or chance that it might happen.

### Examples

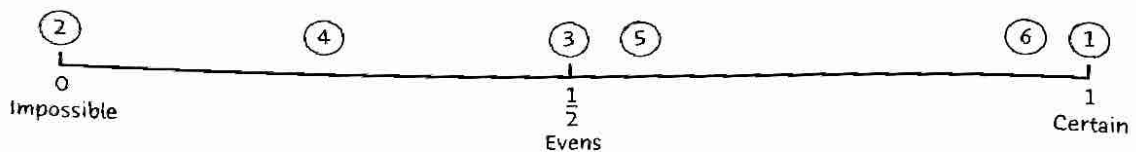
- 1 The sun will rise tomorrow.
- 2 You will be younger next year.
- 3 You spin a coin and get a tail.
- 4 You draw a card from a pack and get a heart.
- 5 Tomorrow will be a sunny day.
- 6 Your teacher is a Martian.

### PROBABILITY

Certain  
Impossible  
Evens  
1 out of 4  
?  
?



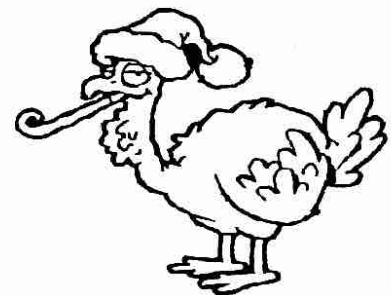
The probabilities of these events can be placed on a scale. The first four statements could not be put anywhere else, but the last two depend upon the circumstances. You might choose to place them in these positions, especially if your teacher is rather odd.



### A

Place the probabilities of these events on a scale like the one above.

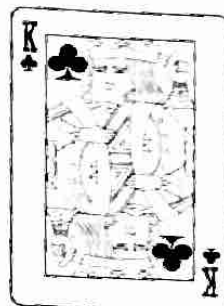
- 1 Christmas Day will be December 25th next year.
- 2 You will learn to drive when you grow up.
- 3 You have the same birthday as the Prime Minister.
- 4 The next child to join the school will be a girl.
- 6 The Queen has a cup of tea at breakfast.
- 7 The sun will rise in the west.
- 8 You will be invited to a party next month.
- 9 The next car to pass the school will be white.
- 10 Tomorrow will be a foggy day.





**B** Work out these probabilities as a fraction and place each on a scale like the one on the opposite page.

- 1 Rolling a dice and not getting a 6.
- 2 Rolling a dice and getting a 0.
- 3 Rolling a dice and getting a number greater than 4.
- 4 Rolling a dice and getting a number less than 7.
- 5 Drawing a card from a pack and getting a club.
- 6 Drawing a card from a pack and getting a red card.
- 7 Drawing a card from a pack and not getting a spade.
- 8 Drawing a card from a pack and getting a king.



9 Compare the expected outcome of rolling a dice with the actual outcome. Copy the table below. Complete the second row of the table. Roll the dice 60 times, filling in the third row after every 10 rolls.

Number of rolls of dice	10	20	30	40	50	60
Number of odd numbers expected						
Actual number of odd numbers						

**C** What is the probability of the arrow pointing at a shaded section when each of these spinners stops spinning?

1

3

5

7

2

4

6

8

Place each probability on a scale like the one on the opposite page..

9 Copy the table below. Complete the second row of the table. Now roll a dice 60 times, filling in the third row every 12 rolls.

Number of rolls of dice	12	24	36	48	60
Number of 6s expected					
Actual number of 6s					



On this page you will learn to understand and use the terms range, mode, median and mean.

**THE RANGE**

The difference between the highest value and the lowest value.

**THE MODE**

The most common value.

**THE MEDIAN**

The middle value when the numbers are rearranged in order of size.

**THE MEAN (OR AVERAGE)**

The total divided by the number of items in the set.

**Example**

The marks achieved by 9 children in a test:

8 4 7 1 8 9 3 8 6

The range of marks is 8.

$$\begin{aligned} \text{Highest} - \text{Lowest} &= 9 - 1 \\ &= 8 \end{aligned}$$

The mode is 8.

Eight occurs three times.

The median is 7.

1 3 4 6 **7** 8 8 8 9

The mean is 6.

$$\begin{aligned} \text{Total marks} \div \text{no. of children} &= 54 \div 9 \\ &= 6 \end{aligned}$$

**A**

For each of the following sets of data find:

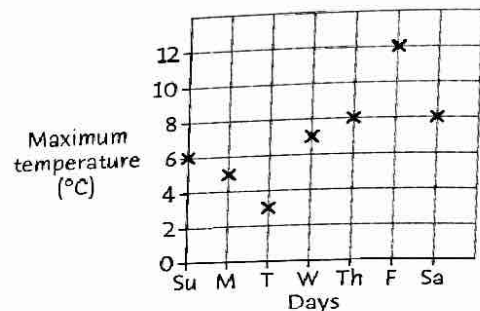
- the range
- the mode
- the median.

- 1 The ages of five friends.  
11 9 7 11 10

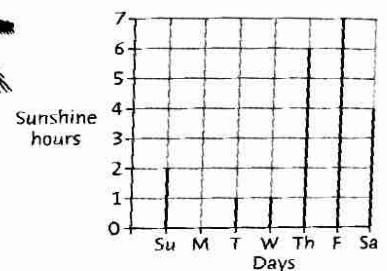
- 2 The goals scored by 11 footballers in one season.

0 2 1 0 1 7  
3 12 4 1 2

- 3 The daily maximum temperatures recorded in one week in March.



- 4 The daily hours of sunshine recorded in the same week.



**B**  
 For each of the following sets of data find:  
 a) the range  
 b) the mode  
 c) the median  
 d) the mean.

1 The ages of 15 children at a birthday party.

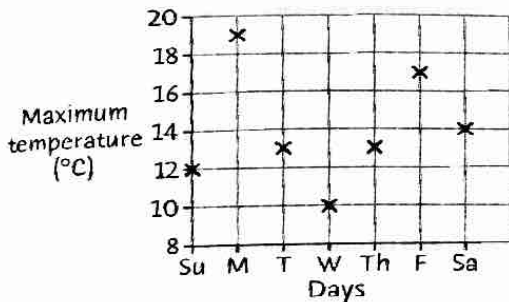
2 5 7 3 4 3 6 2  
 3 5 6 4 5 2 3

2 The lengths in minutes of phone calls made by a bank manager.

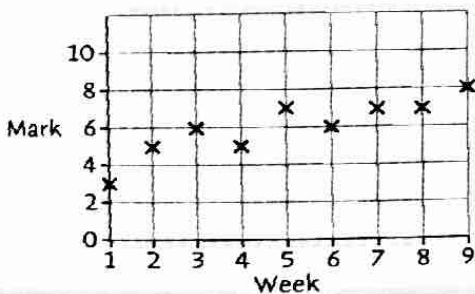
3 2 8 4 3 12 5  
 7 15 3 10 2 4



3 The daily maximum temperatures recorded in one week in May.



4 Joanne's marks in her weekly spelling test.



**C**  
 For each of the following sets of data find:  
 a) the range  
 b) the mode  
 c) the median  
 d) the mean.

1 The times in a 100 m sprint in seconds.

10.03 10.01 9.89 10.04 9.97  
 10.06 10.02 9.94 10.04

2 The heights jumped by 8 children.

1.00 m 0.96 m 1.05 m 0.74 m  
 1.04 m 1.12 m 0.89 m 0.96 m

3 Five people worked in an office. The mean age of the people was 30 and the range of their ages was 6.



Write each sentence below and write next to it whether it is *Possible* or *Impossible*.

- a) Every person was 30 years old.
- b) All the people were at least 28 years old.
- c) The oldest person was 35.
- d) The youngest person was 26.

4 A teacher timed how long seven children took to complete a test. The median time was 11 minutes and the range of times was 6 minutes. Write each sentence below and write next to it whether it is *Possible* or *Impossible*.

- a) The quickest time was 6 minutes.
- b) The slowest time was 18 minutes.
- c) The mean time was 8 minutes.
- d) Three children took 12 minutes.

On these pages you will learn to draw and interpret bar charts with grouped data.

If the spread of a set of data is too large it is usually necessary to group the data before displaying it in the form of a graph.

**Example**

The ages of Mrs. Evans' family on the occasion of her 100th birthday party.

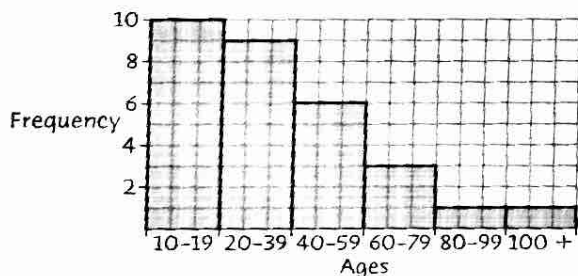
78	18	1	35	26	9
54	32	45	15	11	59
39	42	0	33	21	74
6	28	48	7	24	12
100	57	37	3	81	60



A tally chart showing the grouped ages.

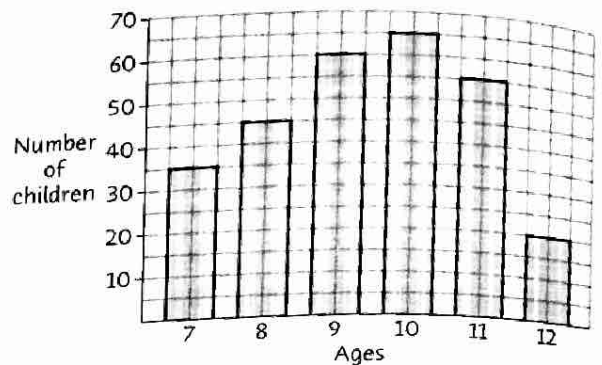
Age	Tally	Frequency
0-19		10
20-39		9
40-59		6
60-79		3
80-99		1
100+		1
Total		<u>30</u>

The data in the tally chart can be displayed in a graph.



**A**

1 This bar chart shows the ages of children at a school disco.



- a) How many children were 9?
- b) How many children were 11?
- c) What was the age of the oldest child?
- d) How many children were younger than 9?
- e) How many children were older than 9?
- f) How many children were there at the disco?



**2**

The distances achieved in a Welly Throwing Competition in metres.

19 24 37 22 18 29 42 14 10 26  
31 16 23 30 36 8 27 11 32 24

Group the data in 10 metre intervals [0-9, 10-19 etc]

Make a tally chart and then display the data in a bar chart.

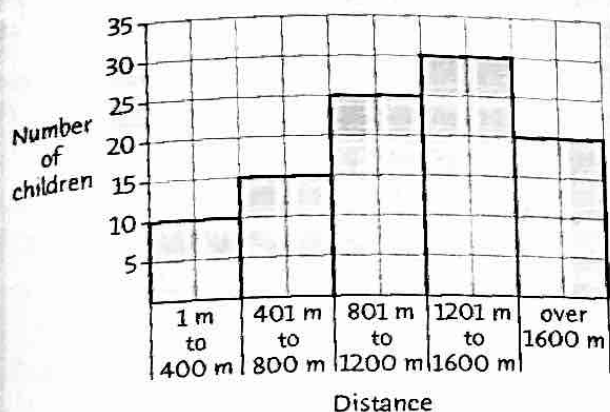
1 The children in one class took the following numbers of minutes to travel to school.

23 51 9 34 12 14 32 53 18 27  
 7 29 17 3 43 36 11 25 42 15  
 24 46 10 16 9 13 8 22 31 14

Group the data in sets of 10 minutes. Make a tally chart and then display the data in a bar chart.



2 This graph shows the distance children in Year 6 travel to school.



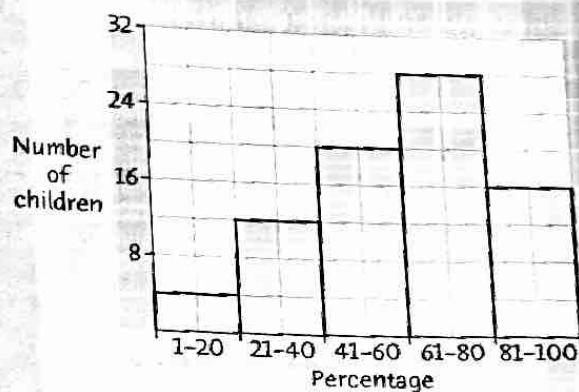
- How many children live nearer to the School than 801 m?
- How many children live further from the School than 800 m?
- How many children are there in Year 6?
- Anjali says that half the children in Year 6 travel more than 1200 metres to school. Is she right? Explain your answer.
- Copy and complete the sentence. One in every  children travels over 1600 metres.

1 The weights of the children in one Year 6 class in kilograms.

46 38 44 41 47 52 40 44 57 36  
 43 31 54 42 38 51 42 61 34 48  
 44 35 46 59 41 49 51 39 45 48

Group the data in sets of 5 kg. Make a tally chart and then display the data in a bar chart.

2 This bar chart shows the percentage marks achieved by children in a Test.



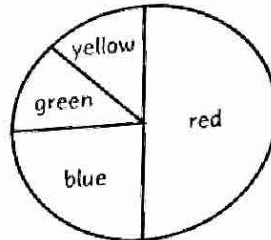
- How many children scored below 41%?
- How many children scored between 41% and 60%?
- How many children scored more than 60%?
- How many children took the test?
- What proportion of the children scored over 80%. Give your answer as a percentage.
- The same children took the same test one term earlier. Draw a graph showing how you think the marks of that test would have been distributed.



On these pages you will learn to interpret pie charts.

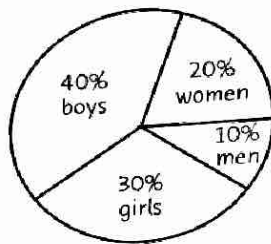
**Examples**

The favourite colours of 80 children.



Colour	Children
red	40
blue	20
green	10
yellow	10

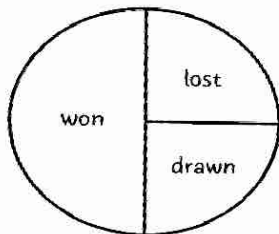
The 300 members of the audience at a performance of Toy Story.



Group	Number
boys	120
girls	90
women	60
men	30

**A**

1



The pie chart shows the results of the 20 games played by a school football team.

How many games were:

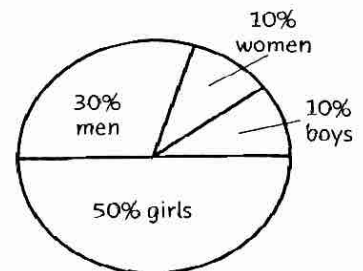
- a) won    b) lost    c) drawn?

2

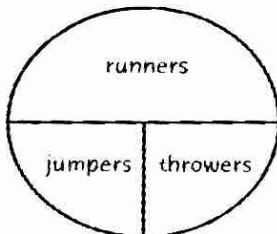
The pie chart shows the 50 passengers travelling on a bus.

How many of the passengers were:

- a) women    b) men    c) children?



3



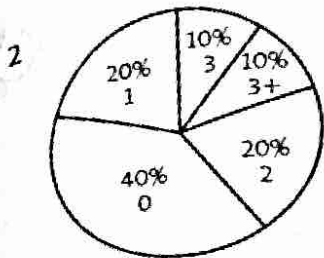
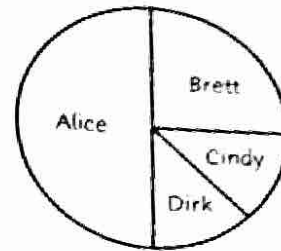
The pie chart shows the 60 competitors at an Athletics Meeting.

How many of the competitors were:

- a) runners  
b) jumpers  
c) throwers?



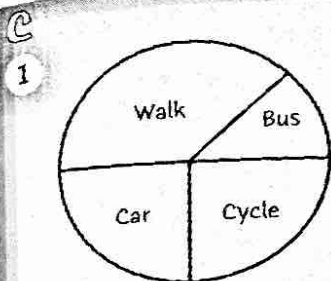
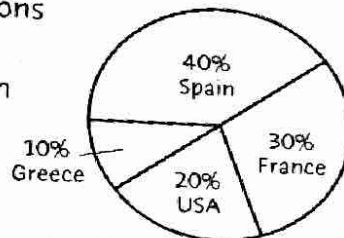
1 The pie chart shows the 48 votes for the Year 6 candidates for the School Council. How many votes did each candidate receive?



The pie chart shows the numbers of passengers in 200 cars. Copy and complete the table.

Passengers	Cars
0	
1	
2	
3	
3+	

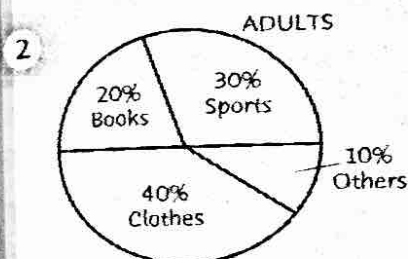
3 The pie chart shows the holiday destinations of 400 tourists waiting for their flights. How many tourists were travelling to each country?



The pie chart shows how the children at one school travel to school each day.

70 children cycle. Estimate:

- how many children travel by bus
- how many children walk
- how many children there are in the school.



In a survey 60 adults and 80 children were asked to choose their favourite shop in a new shopping mall. The results are shown in the pie charts.



- How many children chose games shops?
- How many adults chose book shops?
- Did more adults or children choose clothes shops?
- Did more adults or children choose sports shops?



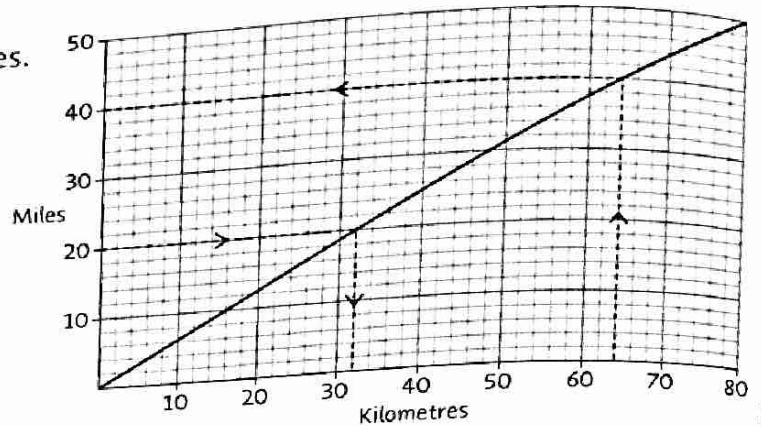
On this page you will learn to use a conversion graph.

### Example

This graph converts miles into kilometres.

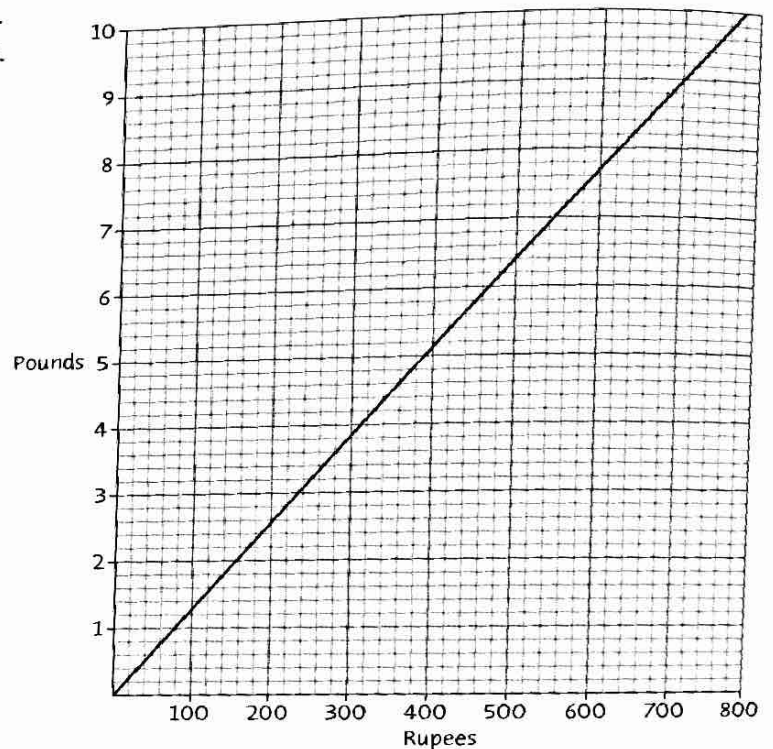
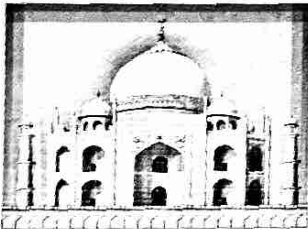
20 miles converts to 32 km.

64 km converts to 40 miles.



### A

The rupee is the currency used in India.  
This graph converts rupees into pounds.

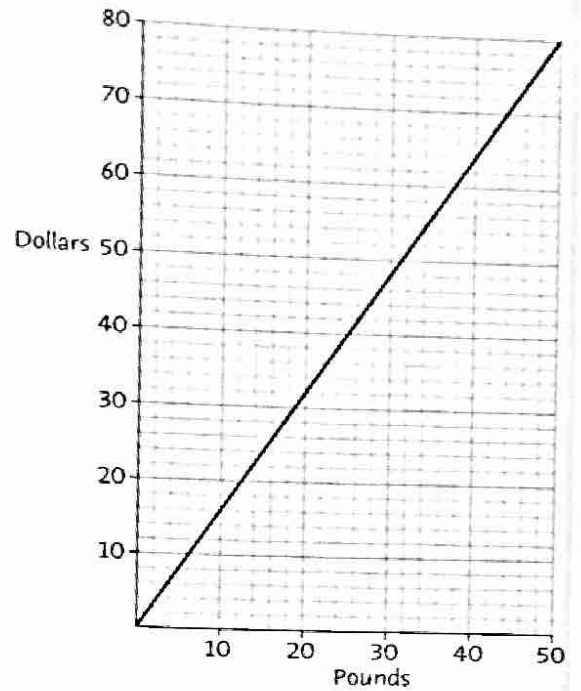


- 1 Convert into pounds:
  - a) 280 rupees
  - b) 420 rupees
  - c) 600 rupees
  - d) 660 rupees
  - e) 380 rupees
  - f) 40 rupees.
- 2 Convert into rupees:
  - a) £8.00
  - b) £4.60
  - c) £10.00
  - d) £7.40
  - e) £2.00
  - f) £6.60.
- 3 On holiday in India, Stanley bought snake charming lessons worth 9 pounds. How much did he pay in rupees?



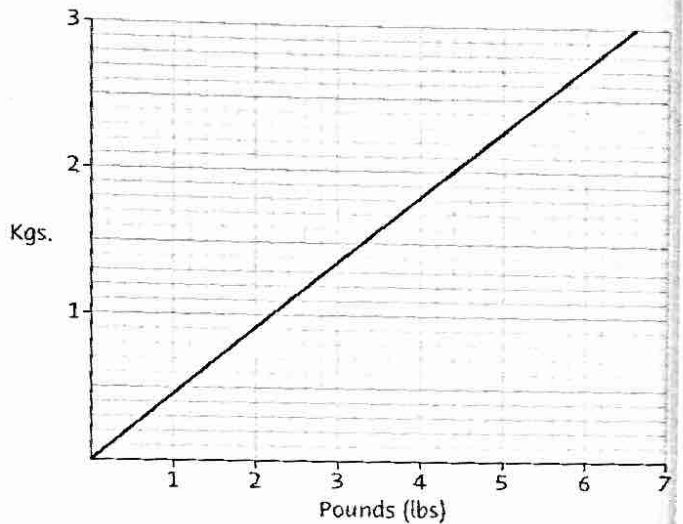
**B** This graph converts U.S. dollars to pounds.

- Convert into pounds:  
 a) 40 dollars      c) 70 dollars      e) 48 dollars  
 b) 64 dollars      d) 16 dollars      f) 24 dollars.
- Convert into dollars:  
 a) £20              c) £50              e) £6  
 b) £16              d) £36              f) £34.
- Before flying home from New York the Wilson family bought gifts for 72 dollars. How much did they spend in pounds?



**C** This graph converts kilograms to pounds.

- Convert to the nearest tenth of a pound.  
 a) 1 kg              d) 0.9 kg  
 b) 1.9 kg          e) 2.4 kg  
 c) 3 kg              f) 0.5 kg
- Convert to the nearest tenth of a kilogram.  
 a) 4 lb              d) 2.4 lb  
 b) 4.4 lb          e) 4.6 lb  
 c) 1.3 lb          f) 6.2 lb



- Use graph paper to draw a graph converting test marks out of 60 to percentages.

Label the horizontal axis in 10s to 100.

Label the vertical axis in 10s to 60.

Join point (100, 60) to the origin (0, 0).

Use your graph to convert these marks to percentages.

- |                 |                 |                 |
|-----------------|-----------------|-----------------|
| a) 30 out of 60 | c) 57 out of 60 | e) 51 out of 60 |
| b) 42 out of 60 | d) 24 out of 60 | f) 33 out of 60 |

Work out

- 1  $1236 \times 10$
- 2  $4.1 \times 10$
- 3  $240 \times 100$
- 4  $1597 \times 100$
- 5  $528 \times 1000$
- 6  $66 \times 1000$
- 7  $18750 \div 10$
- 8  $3.0 \div 10$
- 9  $43700 \div 100$
- 10  $1250\ 000 \div 100$
- 11  $85\ 000 \div 1000$
- 12  $4\ 630\ 000 \div 1000$

Round to the nearest 10.

- 13 136      15 7245
- 14 874      16 1498

Round to the nearest 100.

- 17 8648      19 17 635
- 18 26 971      20 64 253

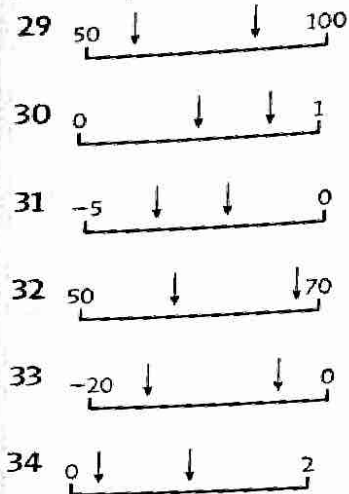
Round to the nearest 1000.

- 21 16 379      23 8542
- 22 127 600      24 59 837

Approximate by rounding to the nearest whole one.

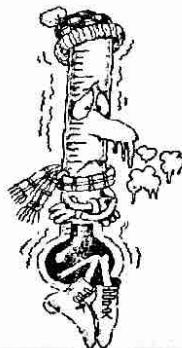
- 25  $14.6 + 8.3$
- 26  $25.5 - 17.8$
- 27  $8.6 \times 4.1$
- 28  $53.7 \div 5.9$

Estimate the numbers shown by the arrows.



35 Copy and complete the table showing changes in temperature.

OLD	CHANGE	NEW
4°C	-10°C	
-7°C	+15°C	
-2°C		6°C
	-14°C	-3°C
-1°C	-8°C	
5°C		-11°C
	+9°C	4°C
-18°C	+13°C	
-13°C		3°C
	-17°C	12°C



Copy each sequence and write the next four terms.

- 36 2.5 2.2 1.9 1.6
- 37 -20 -16 -12 -8
- 38 79 68 57 46
- 39 0.02 0.04 0.06 0.08
- 40 -14 -11 -8 -5
- 41 10 20 40 70
- 42 0.35 0.48 0.61 0.74
- 43 100 81 64 49

Find three numbers that are multiples of both:

- 44 6 and 7      46 5 and 8
- 45 4 and 13      47 3 and 25.

Write down the first prime number after:

- 48 8      52 44
- 49 14      53 55
- 50 20      54 80
- 51 32      55 90.

Find all the prime factors of:

- 56 27      59 76
- 57 66      60 90
- 58 45      61 84.

Work out

- 62  $8^2 + 5^2$       65  $30^2$
- 63  $9^2 - 7^2$       66  $11^2$
- 64  $10^2 + 6^2$       67  $25^2$

Copy and complete these equivalent fractions.

- 1  $\frac{3}{4} = \frac{\square}{20}$     4  $\frac{3}{10} = \frac{21}{\square}$   
 2  $\frac{2}{5} = \frac{\square}{30}$     5  $\frac{5}{6} = \frac{15}{\square}$   
 3  $\frac{7}{9} = \frac{\square}{18}$     6  $\frac{7}{8} = \frac{35}{\square}$

Cancel each fraction into its simplest form.

- 7  $\frac{33}{55}$     9  $\frac{32}{48}$   
 8  $\frac{80}{100}$     10  $\frac{18}{42}$

Arrange in ascending order.

- 11  $\frac{5}{8}, \frac{3}{4}, \frac{1}{2}, \frac{9}{16}$   
 12  $\frac{5}{12}, \frac{1}{3}, \frac{1}{2}, \frac{5}{9}$

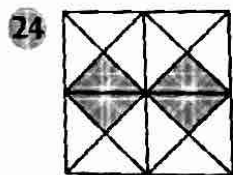
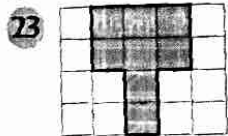
Change to mixed numbers.

- 13  $\frac{14}{5}$     16  $\frac{14}{3}$   
 14  $\frac{27}{8}$     17  $\frac{319}{100}$   
 15  $\frac{57}{10}$     18  $\frac{60}{9}$

Change to improper fractions.

- 19  $8\frac{9}{10}$     21  $6\frac{7}{11}$   
 20  $3\frac{5}{6}$     22  $2\frac{17}{25}$

Write the fraction shaded in its simplest form.



Write as decimals.

- 25  $4\frac{32}{100}$     27  $\frac{86}{1000}$   
 26  $1\frac{723}{1000}$     28  $2\frac{9}{100}$

Write as mixed numbers.

- 29 5.35    31 6.127  
 30 23.04    32 2.008

Write the value of the underlined digit.

- 33 7.25    37 2.479  
 34 0.801    38 48.62  
 35 17.08    39 0.105  
 36 5.736    40 12.94

41 Copy the line and locate the numbers.

1.05 1.08 1.025 1.065



42 Write the number shown by each arrow.



Round to the nearest:  
 whole one    tenth.

- 43 3.74    47 4.61  
 44 4.29    48 29.38  
 45 29.81    49 3.45  
 46 106.52    50 37.83

51 Write in ascending order.

7.58, 0.78, 0.708, 7.08

52 Copy and complete the table.

Fraction	Decimal	%
$\frac{1}{10}$	0.1	10%
$\frac{37}{100}$		
$\frac{3}{4}$		
	0.72	
	0.3	
	0.09	
		50%
		23%
		7%

Find

- 53  $\frac{3}{8}$  of 40  
 54  $\frac{4}{5}$  of 60  
 55  $\frac{23}{100}$  of 3 m  
 56  $\frac{375}{1000}$  of 1 m  
 57 10% of 58  
 58 30% of 240  
 59 20% of £14.00  
 60 5% of £6.20  
 61 Lenny has 3 green marbles to every 4 red marbles. If he has 20 red marbles, how many green marbles does he have?  
 62 8000 people visited a castle. 70% were adults. How many were children?

Copy and complete.

- 1  $305 + 298 = \square$
- 2  $4.8 + 3.1 = \square$
- 3  $5.7 + \square = 9.5$
- 4  $3.64 + \square = 4$
- 5  $\square + 6700 = 14\,300$
- 6  $\square + 0.37 = 0.87$
- 7  $4003 - 1986 = \square$
- 8  $8.6 - 1.9 = \square$
- 9  $4300 - \square = 1900$
- 10  $7.1 - \square = 2.8$
- 11  $\square - 0.16 = 0.6$
- 12  $\square - 5800 = 3700$

Work out

- |   |   |
|---|---|
| 13 $\begin{array}{r} 3249 \\ +1563 \\ \hline \end{array}$ | 17 $\begin{array}{r} 4753 \\ -1278 \\ \hline \end{array}$ |
| 14 $\begin{array}{r} 4385 \\ +3948 \\ \hline \end{array}$ | 18 $\begin{array}{r} 7480 \\ -2916 \\ \hline \end{array}$ |
| 15 $\begin{array}{r} 5167 \\ +1856 \\ \hline \end{array}$ | 19 $\begin{array}{r} 9619 \\ -5834 \\ \hline \end{array}$ |
| 16 $\begin{array}{r} 6478 \\ +2757 \\ \hline \end{array}$ | 20 $\begin{array}{r} 6250 \\ -5791 \\ \hline \end{array}$ |

Set out correctly and find the totals.

- 21  $1.25 + 14.6$
- 22  $0.309 + 8.4$
- 23  $4.31 + 17.2 + 0.695$
- 24  $25.91 + 0.8 + 1.357$

Set out correctly and find the differences.

- 25  $7186$  and  $15\,470$
- 26  $729$  and  $42\,031$
- 27  $5.31 - 1.9$
- 28  $3.2 - 1.85$

Copy and complete

- 29  $7 \times 0.6 = \square$
- 30  $15 \times 99 = \square$
- 31  $8 \times \square = 4.0$
- 32  $1.3 \times \square = 1.3$
- 33  $\square \times 100 = 30$
- 34  $\square \times 7 = 4.9$
- 35  $27 \div 10 = \square$
- 36  $0.3 \div 2 = \square$
- 37  $12 \div \square = 0.6$
- 38  $300 \div \square = 60$
- 39  $\square \div 6 = 1.4$
- 40  $\square \div 100 = 3.7$

Copy and complete.

- |  |  |
|--|--|
| 41 $\begin{array}{r} 1576 \\ \times \quad 4 \\ \hline \end{array}$ | 43 $\begin{array}{r} 4629 \\ \times \quad 6 \\ \hline \end{array}$ |
| 42 $\begin{array}{r} 2938 \\ \times \quad 7 \\ \hline \end{array}$ | 44 $\begin{array}{r} 3574 \\ \times \quad 8 \\ \hline \end{array}$ |

Copy and complete.

- 45  $6 \overline{)457}$
- 47  $5 \overline{)83.5}$
- 46  $14 \overline{)314}$
- 48  $9 \overline{)312.3}$

Copy and complete.

- |  |  |
|--|--|
| 49 $\begin{array}{r} 325 \\ \times 19 \\ \hline \end{array}$ | 50 $\begin{array}{r} 276 \\ \times 47 \\ \hline \end{array}$ |
|--|--|

Work out

- 51  $2.38 \times 3$
- 53  $4.72 \times 7$
- 52  $0.56 \times 6$
- 54  $3.95 \times 9$

Work out and give the remainder as a fraction.

- 55  $86 \div 6$
- 57  $389 \div 100$
- 56  $158 \div 9$
- 58  $160 \div 7$

Work out and give the remainder as a decimal.

- 59  $126 \div 10$
- 61  $67 \div 5$
- 60  $74 \div 4$
- 62  $190 \div 8$

- 63 Ai Ping has £3159 in her bank account. She withdraws £1374. How much is left in the account?

- 64 How many hours are there in December?

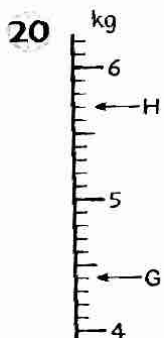
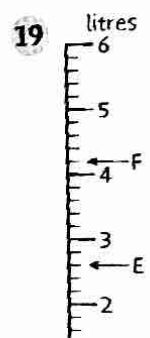
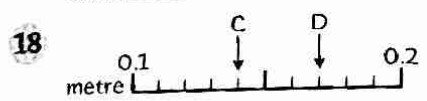
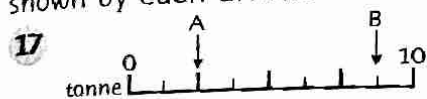
- 65 A box holds 16 tins. How many boxes can be filled from 360 tins? How many tins are left over?

- 66 There are 28 nails in each bag. How many nails are there in 35 bags?

**A** Copy and complete.

- 1  $1.738 \text{ km} = \square \text{ m}$
- 2  $27 \text{ m} = \square \text{ km}$
- 3  $9 \text{ cm} = \square \text{ m}$
- 4  $1.3 \text{ m} = \square \text{ cm}$
- 5  $0.146 \text{ m} = \square \text{ mm}$
- 6  $8 \text{ mm} = \square \text{ cm}$
- 7  $0.7 \text{ m} = \square \text{ cm}$
- 8  $395 \text{ m} = \square \text{ km}$
- 9  $2.8 \text{ kg} = \square \text{ g}$
- 10  $1500 \text{ kg} = \square \text{ t}$
- 11  $368 \text{ g} = \square \text{ kg}$
- 12  $5 \text{ t} = \square \text{ kg}$
- 13  $2 \text{ litres} = \square \text{ cl}$
- 14  $1.9 \text{ litres} = \square \text{ ml}$
- 15  $50 \text{ ml} = \square \text{ litres}$
- 16  $300 \text{ ml} = \square \text{ cl}$

Work out the measurement shown by each arrow.



**B**

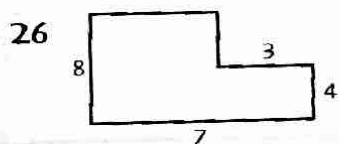
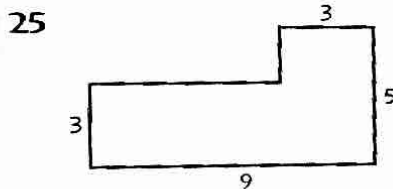
- 21 70 cl of wine is poured equally into 5 glasses. How much wine does each glass contain?
- 22 A ribbon is 1.8 m long. 137 mm is cut off. How long is the ribbon which is left?
- 23 A cyclist travels at 6 metres every second. How far will she cycle in 10 minutes in kilometres?



- 24 The 40 tins of tuna in a box weigh 10 kg. What does each tin weigh in grams?

For each shape work out:

- a) the area
  - b) the perimeter.
- (All lengths are in cm.)



**C**

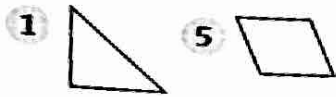
Copy and complete.

- 27 85 years =  $\square$  decades
- 28 91 days =  $\square$  weeks
- 29 132 hours =  $\square$  days
- 30 540 secs. =  $\square$  mins.
- 31 1 day =  $\square$  minutes
- 32 3 decades =  $\square$  months
- 33 2 weeks =  $\square$  hours
- 34 2 hours =  $\square$  seconds
- 35 What will be the date four weeks after:
  - a) October 15th
  - b) April 23rd
  - c) February 8th 2008
  - d) December 25th?
- 36 Turkey must be cooked for 40 minutes for every kilogram. Copy and complete the table.

WEIGHT	START	FINISH
5 kg	15:45	
6.5 kg	08:30	
9.5 kg	06:25	
7.5 kg	12:50	

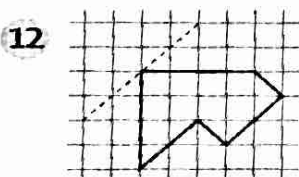
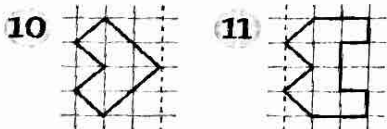
- 37 The time in Tokyo is 9 hours ahead of the time in London. What is the time in Tokyo if the time in London is:
  - a) 08:00
  - b) 19:00?

Write the names of each of these 2-D shapes.

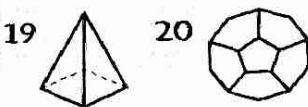
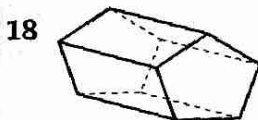
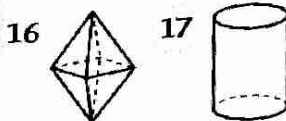
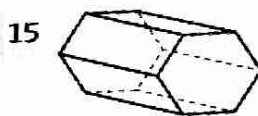
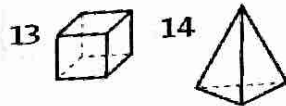


- 9 Which of the above shapes have:
- a) parallel lines
  - b) perpendicular lines
  - c) equal opposite angles
  - d) equal adjacent angles?

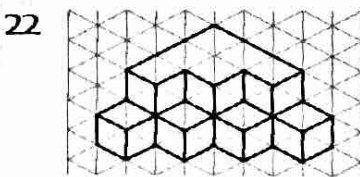
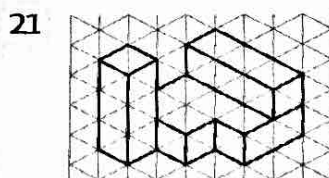
Use squared paper. Copy the shape and the mirror line and sketch the reflection.



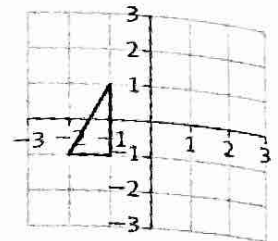
For each 3-D shape:  
a) write its name  
b) describe its flat faces.



How many cubes are needed to build each shape?



23 Copy the grid and the triangle.



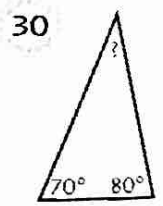
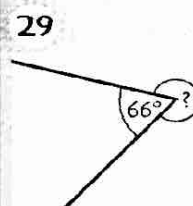
Translate the triangle:  
a) Right 2, Up 2  
b) Left 1, Down 2.

- 24 Copy the grid above. Plot these points and join them up in this order:  
(0, 0) (0, 2) (1, 2) (1, 1)  
(3, 1) (3, 0) (0, 0)  
Rotate the shape about (0, 0):  
a) 90° clockwise  
b) 180°.

Use a protractor. Draw these angles.

- 25 76°      27 18°  
26 143°      28 102°

Calculate the missing angles.



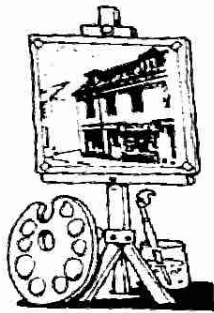
## INTERPRETING DATA

For questions one to three find:

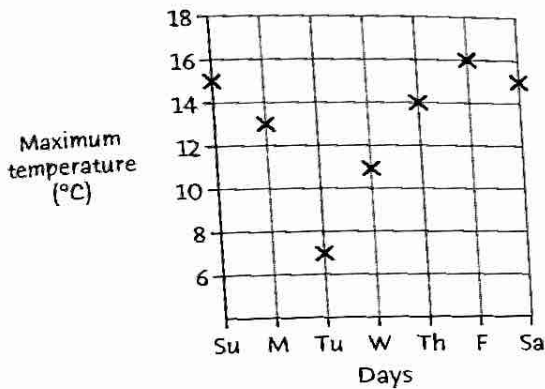
- a) the range
- b) the mode
- c) the median
- d) the mean.

1 The numbers of paintings completed each day by an artist.

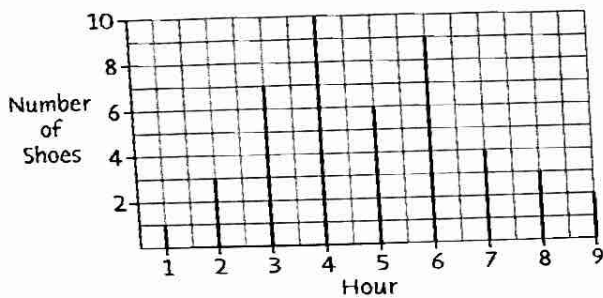
3	1	0	2
3	4	0	1
2	4	1	5
0	1	3	



2 The daily maximum temperatures recorded in one week in March.

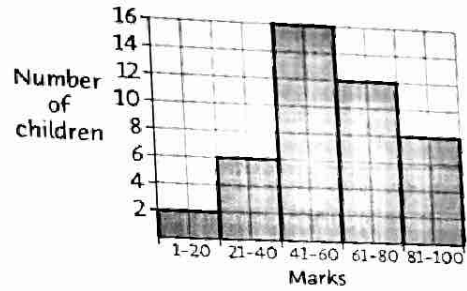


3 The numbers of shoes sold by a shop in each hour of trading.



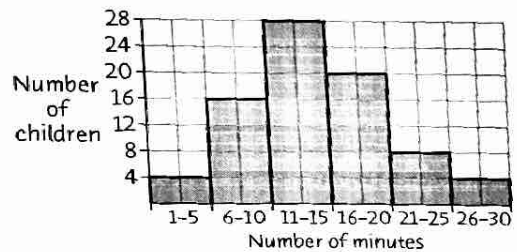
## BAR CHARTS WITH GROUPED DATA

4 This bar chart shows the marks achieved by children in a test.



- a) How many children scored between 41 and 60 marks?
- b) How many children scored over 60 marks?
- c) How many children took the test?

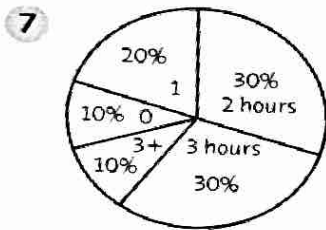
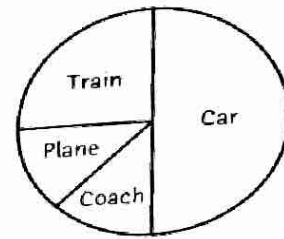
5 This bar chart shows the time taken by children to solve a problem.



- a) How many children took less than 11 minutes?
- b) How many children took more than 20 minutes?
- c) How many children altogether solved the problem?
- d) What percentage of the children took more than 15 and less than 21 minutes?
- e) What percentage of the children took less than 6 minutes?

PIE CHARTS

- 6 This pie chart shows how 72 people travelled to the same hotel.  
Write down how many people travelled by:  
a) train    b) car    c) plane.



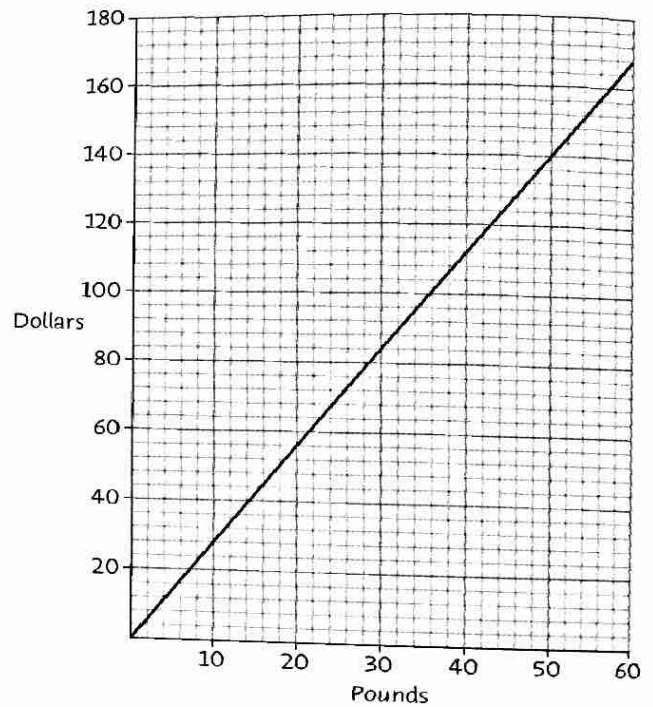
This pie chart shows the number of hours in one evening spent watching television by 40 children.  
Copy and complete the table

HOURS	CHILDREN
0	
1	
2	
3	
3+	

CONVERSION GRAPHS

This graph converts Australian dollars to pounds.

- 8 Convert into pounds:  
a) 140 dollars    d) 84 dollars  
b) 28 dollars    e) 92 dollars  
c) 100 dollars    f) 152 dollars
- 9 Convert into dollars:  
a) £20    d) £40  
b) £60    e) £16  
c) £34    f) £25





**A**

Find a pair of numbers with:

- 1 a sum of 14 and a product of 48.
- 2 a sum of 13 and a product of 22.
- 3 a sum of 17 and a product of 70.
- 4 a sum of 16 and a product of 48.
- 5 a sum of 16 and a product of 63.
- 6 a sum of 30 and a product of 125.
- 7 a sum of 17 and a product of 42.
- 8 a sum of 50 and a product of 600.
- 9 a sum of 21 and a product of 80.
- 10 a sum of 24 and a product of 144.

**B**

Find the number.

- 1 a 2-digit number  
a prime number  
the sum of its digits is 13
- 2 a 2-digit number  
a multiple of both 3 and 4  
the sum of its digits is 15
- 3 a prime number  
a factor of 78  
a 2-digit number
- 4 a 3-digit number  
a square number  
the product of its digits is 2
- 5 a multiple of 9  
a 3-digit number below 200  
the product of its digits is 16
- 6 a 2-digit number  
a prime number  
the product of its digits is 24
- 7 a square number  
a 3-digit number  
the product of its digits is 20
- 8 a 2-digit number  
a factor of 184  
a prime number
- 9 a multiple of 11  
a multiple of 7  
the product of its digits is 6
- 10 a 3-digit number  
the sum of its digits is 9  
a multiple of 37



**C**

Find two consecutive numbers with a product of:

- |       |        |        |        |         |         |
|-------|--------|--------|--------|---------|---------|
| 1 552 | 3 702  | 5 812  | 7 1892 | 9 1722  | 11 4160 |
| 2 992 | 4 1122 | 6 1406 | 8 2256 | 10 2756 | 12 8010 |

Find a pair of any numbers with a product of:

- |        |        |        |        |        |         |
|--------|--------|--------|--------|--------|---------|
| 13 115 | 15 287 | 17 395 | 19 671 | 21 493 | 23 851  |
| 14 111 | 16 143 | 18 201 | 20 623 | 22 949 | 24 1007 |

[You can't use '1' as one of the numbers!]

Copy and complete by writing the missing numbers in the boxes.

## A

1  $(\square + 6) + 8 = 18$

2  $(\square - 6) \times 3 = 30$

3  $(\square \times 2) - 10 = 6$

4  $(\square \div 9) \div 1 = 9$

5  $(\square + 13) \div 3 = 7$

6  $(\square - 16) + 7 = 15$

7  $(\square \times 5) \times 8 = 80$

8  $(\square \div 7) - 2 = 7$

9  $(\square + 2) \times 6 = 36$

10  $(\square - 17) - 6 = 26$

11  $(\square \times 4) \div 2 = 8$

12  $(\square \div 3) + 11 = 17$

## B

1 
$$\begin{array}{r} \square 4 \square \\ + 1 \square 8 \\ \hline 4 1 4 \end{array}$$

2 
$$\begin{array}{r} 5 \square 7 \\ - \square 6 \square \\ \hline 3 6 3 \end{array}$$

3 
$$\begin{array}{r} \square \square 9 \\ \times \quad \quad 4 \\ \hline 1 3 9 \square \end{array}$$

4 
$$\begin{array}{r} 8 7 \\ 3 \overline{) 2 \square 1} \end{array}$$

5 
$$\begin{array}{r} 3 \square 3 \\ + \square 7 \square \\ \hline 6 5 2 \end{array}$$

6 
$$\begin{array}{r} \square 6 \square \\ - 2 \square 8 \\ \hline 1 6 5 \end{array}$$

7 
$$\begin{array}{r} \square \square 7 \\ \times \quad \quad 6 \\ \hline 3 1 6 \square \end{array}$$

8 
$$\begin{array}{r} 4 8 \\ 6 \overline{) 2 \square 8} \end{array}$$

9 
$$\begin{array}{r} \square 3 \square \\ + 1 \square 5 \\ \hline 6 8 3 \end{array}$$

10 
$$\begin{array}{r} 8 \square 0 \\ - \square 2 \square \\ \hline 3 8 3 \end{array}$$

11 
$$\begin{array}{r} \square \square 5 \\ \times \quad \quad 9 \\ \hline 2 5 6 \square \end{array}$$

12 
$$\begin{array}{r} 5 4 \\ 9 \overline{) 4 \square 6} \end{array}$$

13 
$$\begin{array}{r} 4 \square 5 \\ + \square 3 \square \\ \hline 8 2 0 \end{array}$$

14 
$$\begin{array}{r} \square 3 \square \\ - 1 \square 6 \\ \hline 1 7 6 \end{array}$$

15 
$$\begin{array}{r} \square \square 6 \\ \times \quad \quad 7 \\ \hline 1 6 5 \square \end{array}$$

16 
$$\begin{array}{r} 9 6 \\ 6 \overline{) 5 \square 6} \end{array}$$

17 
$$\begin{array}{r} \square 9 \square \\ + 3 \square 7 \\ \hline 7 0 1 \end{array}$$

18 
$$\begin{array}{r} 6 \square 1 \\ - \square 7 \square \\ \hline 2 6 3 \end{array}$$

19 
$$\begin{array}{r} \square \square 6 \\ \times \quad \quad 3 \\ \hline 2 4 4 \square \end{array}$$

20 
$$\begin{array}{r} 7 7 \\ 4 \overline{) 3 \square 8} \end{array}$$

21 
$$\begin{array}{r} 5 \square 9 \\ + \square 9 \square \\ \hline 8 5 3 \end{array}$$

22 
$$\begin{array}{r} \square 2 \square \\ - 4 \square 3 \\ \hline 4 2 7 \end{array}$$

23 
$$\begin{array}{r} \square \square 2 \\ \times \quad \quad 8 \\ \hline 2 8 1 \square \end{array}$$

24 
$$\begin{array}{r} 6 5 \\ 8 \overline{) 5 \square 0} \end{array}$$

## C

1  $\square 7 \times 1 \square = 611$

2  $3 \square \times \square 5 = 510$

7 
$$\begin{array}{r} 4 1 7 \\ 5 \overline{) \square 0 \square 5} \end{array}$$

8 
$$\begin{array}{r} 3 6 9 \\ 4 \overline{) \square 4 \square 6} \end{array}$$

3  $\square 8 \times 2 \square = 644$

4  $4 \square \times \square 8 = 1786$

9 
$$\begin{array}{r} 2 3 7 \\ 6 \overline{) \square 4 \square 2} \end{array}$$

10 
$$\begin{array}{r} 3 6 6 \\ 8 \overline{) \square 9 \square 8} \end{array}$$

5  $\square 4 \times 2 \square = 1512$

6  $3 \square \times \square 7 = 1221$

11 
$$\begin{array}{r} 4 8 3 \\ 7 \overline{) \square 3 \square 1} \end{array}$$

12 
$$\begin{array}{r} 3 4 7 \\ 9 \overline{) \square 1 \square 3} \end{array}$$